

# STATE OF DELAWARE

THIS COPY IS FOR INFORMATION  
ONLY. YOU MUST PURCHASE  
THE PROPOSAL IN ORDER TO  
SUBMIT A BID.



## DEPARTMENT OF TRANSPORTATION

### BID PROPOSAL

for

**CONTRACT** T201007402.01

**FEDERAL AID PROJECT NO.** BHOS-N049(1)

**BR 1-585 ON N049 AUGUSTINE CUTOFF OVER BRANDYWINE CREEK**

**NEW CASTLE COUNTY**

**ADVERTISEMENT DATE:** Oct 1, 2012

**Completion Date** 502 Calendar Days

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

Bids will be received in the Bidder's Room, Transportation Administration Center, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time October 23, 2012



**Contract No.T201007402.01**

**Federal Aid Project No. BHOS-N049(1)**

**BR 1-585 ON N049 AUGUSTINE CUTOFF OVER BRANDYWINE CREEK  
NEW CASTLE COUNTY**

**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 materials for BR 1-585 ON N049 AUGUSTINE CUT-OFF OVER BRANDYWINE CREEK, and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

**COMPLETION DATE**

All work on this contract must be complete within 502 Calendar Days . The Contract Time includes an allowance for 77 Weather Days

It is the Department's intent to issue a Notice to Proceed such that work starts on or about March 1, 2013.

**ELECTRONIC BIDDING**

**This project incorporates a newer version of the electronic bidding system, Expedite 5.9a.** The installation file and instructions are included in the CD package required for bidding.

BIDDERS MUST REQUEST A CD OF THE OFFICIAL PLANS AND SPECIFICATIONS FROM THE DEPARTMENT IN ORDER TO SUBMIT A BID.

**PROSPECTIVE BIDDERS NOTE:**

1. No retainage will be withheld on this contract.
2. The Department has adopted an External Complaint Procedure. The procedure can be viewed on our website at; <http://www.deldot.gov/information/business/>, or you may request a copy by calling (302) 760-2555.
3. **Proposed Trainee Plans are required.** The number of required programs is listed in the Training Special Provisions located in this contract's General Notices. The program must be submitted to the Department within 10 Calendar Days of notification of apparent low bidder status. Contract Award will not take place until acceptable On-the-Job (OJT) program plans are received by the Civil Rights Group of the Department.

Failure of the apparent low bidder to present copies of the required certifications and/or an acceptable OJT Trainee Program within ten (10) Calendar Days of notification of apparent low bidder status shall create a rebuttable presumption that the bid is not responsive.

Bidders are referred to the Department's OJT Program Guidelines posted with this document.

4. Please note the Special Provision titled **Changes to Project Documents During Advertisement**. The Department is using an alternative method of providing bid documents for this contract.

**STATE OF DELAWARE  
CONSTRUCTION ITEMS UNITS OF MEASURE**

<b>English Code</b>	<b>English Description</b>	<b>Multiply By</b>	<b>Metric Code</b>	<b>Metric Description</b>	<b>Suggested CEC Metric Code</b>
ACRE	Acre	0.4047	ha	Hectare	HECTARE
BAG	Bag	N/A	Bag	Bag	BAG
C.F.	Cubic Foot	0.02832	m <sup>3</sup>	Cubic Meter	M3
C.Y.	Cubic Yard	0.7646	m <sup>3</sup>	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 <sup>3</sup>	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 <sup>2</sup>	Square Meter	M2
S.Y.	Square Yard	0.8361	m <sup>2</sup>	Square Meter	M2
SY-IN	Square Yard-Inch	0.8495	m <sup>2</sup> -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 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.

### **REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION**

Delaware Code, Title 29, Chapter 69, Section 6960, Paragraph

"Every contract based upon these specifications shall contain a stipulation that certified sworn payroll reports be maintained by every contractor and subcontractor performing work upon the site of construction. The contractor and subcontractor shall keep and maintain the sworn payroll information for a period of two (2) years from the last day of the work week covered by the payroll. A certified copy of these payroll reports shall be made available:

1. For inspection or furnished upon request to a representative of the Department of Labor;
2. Upon request by the public or for copies thereof. However, a request by the public must be made through the Department of Labor. The requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Department of Labor in accordance with the Department's copying fee policy. The public shall not be given access to the records at the principal office of the contractor or subcontractor; and
3. The certified payroll records shall be on a form provided by the Department of Labor or shall contain the same information as the form provided by the Department and shall be provided within ten (10) days from receipt of notice requesting the records from the Department of Labor."

Contractor may contact:

Department of Labor  
Division of Industrial Affairs  
4425 No. Market Street  
Wilmington, DE 19802  
Telephone (302) 761-8200

PREFERENCE FOR DELAWARE LABOR:

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

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

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."

For all contracts which are identified as Federal-aid projects by having a Federal-aid number inserted in the appropriate space on the cover sheet of the proposal, if there is a conflict between the above Section 6962 and Federal law ~~and~~ the requirements of the above Section 6962 shall not apply.

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."

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

"a. As a condition of the awarding of any contract for public works financed in whole or in part by State appropriation, such contracts shall include the following provisions:

'During the performance of this contract, the contractor agrees as follows:

I. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex or natural origin. The contractor will take positive steps to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, sex 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.

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

TAX CLEARANCE:

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



LICENSE:

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

TO REPORT BID RIGGING ACTIVITIES:

CALL 1-800-424-9071

The U. S. Department of Transportation (DOT) operates the above 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.

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.

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).

\* \* \* \* \*

#### 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 One(1). 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 provided 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 10 % 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 ten (10) calendar days after the bid opening, executed originals of each and every DBE subcontract to satisfy contract goals consistent with the DBE Program Assurance submitted as part of the bid package.

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

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

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

\* \* \* \* \*

#### CRITICAL DBE REQUIREMENTS

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

1. In the event that the bidder cannot meet the DBE goal as set forth in this specification, he/she shall at the time of bid submit to the Department that percentage of the DBE Goal that will be met, if any, on the written and notarized assurance made a part of this contract. The contractor shall also at the time of bid submit all documentation that the contractor wishes to have the Department consider in determining that the contractor made a Good Faith Effort to meet contract DBE Goals. The Department will not accept Good Faith Effort documentation other than on the scheduled date and time of the bid opening. However, the Department may ask for clarification of information submitted should the need arise.
2. A bid which does not contain either a completely executed DBE Program Assurance and/or Good Faith Effort documentation, where appropriate, shall be declared non-responsive and shall not be considered by the Department.
3. Failure of the apparent low bidder to present originals of all DBE subcontracts to substantiate the volume of work to be performed by DBE's as indicated in the bid within ten (10) 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.

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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 Administration, DelDOT, P. O. Box 778, Dover, Delaware 19903. The reconsideration official will not have played any role in the original determination that the bidder did not document sufficient good faith efforts.

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

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**FHWA-1273 -- Revised May 1, 2012**

**REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS**

(Exclusive of Appalachian Contracts)

- 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 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 any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

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

## **VI. SUBLETTING OR ASSIGNING THE CONTRACT**

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

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

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

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

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

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

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

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

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

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

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

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

## **VII. SAFETY: ACCIDENT PREVENTION**

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

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

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

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

## **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
- d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant,"



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

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

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

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

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

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

\* \* \* \* \*

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

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

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

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

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

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

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

## 2. Instructions for Certification - Lower Tier Participants:

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

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

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

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

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

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

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

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

(<https://www.epls.gov/>), which is compiled by the General Services Administration.

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

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

\* \* \* \* \*

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

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

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

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

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

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

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

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

\* \* \* \* \*

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.

### 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.

Title 29 Del.C. §6960 relating to wages further stipulates "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", and ... "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."

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

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

### **PREVAILING WAGE REQUIREMENTS**

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

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

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

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

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

PREVAILING WAGES FOR HIGHWAY CONSTRUCTION EFFECTIVE MARCH 15, 2012

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	45.63	45.63	14.51
CARPENTERS	49.06	49.06	39.22
CEMENT FINISHERS	30.40	26.13	23.29
ELECTRICAL LINE WORKERS	22.50	54.05	21.25
ELECTRICIANS	59.10	59.10	59.10
IRON WORKERS	42.20	22.98	25.35
LABORERS	30.23	26.66	29.03
MILLWRIGHTS	16.11	15.63	13.49
PAINTERS	56.07	56.07	56.07
PILEDRIVERS	59.23	23.75	26.95
POWER EQUIPMENT OPERATORS	41.41	27.54	26.43
SHEET METAL WORKERS	22.75	20.31	18.40
TRUCK DRIVERS	32.17	22.45	22.15

CERTIFIED: 9/12/12

BY: 

ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

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

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

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

PROJECT: EBHOS-N049 T201007402.01 Augustine Cutoff over Brandywine, New Castle County, New Castle County

**GENERAL DECISION: DE120013 7/27/2012 DE13**

General Decision Number: DE20100010

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: New Castle County in Delaware

HIGHWAY CONSTRUCTION PROJECTS: (excluding tunnels, building structures in rest area projects and railroad construction; bascule, suspension and spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Modification Number 0 Publication Date 07/27/2012

SUDE2010-001 03/15/2012		Rates	Fringes
Bricklayer		45.63	
Carpenter		49.06	
Cement Mason/Concrete Finisher		30.40	
ELECTRICIAN			
Electrician		59.10	
Line Worker		22.50	
Ironworker		42.20	
Laborer		30.23	
Millwright		16.11	
Operator: Piledriver		59.23	
Painter		56.07	
Power Equipment Operation		41.41	
Sheet Metal Worker		22.75	
Truck Driver		32.17	

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

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

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

## Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than “SU” denotes that the union classification and rate have found to be prevailing for the classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

## Non-Union Identifiers

Classifications listed under an “SU” identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicated the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Way Determination on the date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

## 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](http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml)

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

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



## **SPECIAL PROVISIONS**



## **CHANGES TO PROJECT DOCUMENTS DURING ADVERTISEMENT**

### **1. PRINTED PLANS AND SPECIFICATIONS NOT AVAILABLE FROM DELDOT.**

The Department is not providing printed plans or specifications for this project. Bidders must contact the Department in order to receive a CD that contains all bid documents. Bidders are able to use the CD to print the plans and specifications, or have them printed from the Website. While the plans and specifications are available on-line at DelDOT's Website, the Website bid documents are not authorized for submitting bids, and the Website documents are marked as such. To receive required bid Documents on a CD, contact:

Contract Administration  
Delaware Department of Transportation  
P.O. Box 778, Dover, DE 19903  
e-mail: [dot-ask@state.de.us](mailto:dot-ask@state.de.us)  
Phone: (302) 760-2030  
FAX: (302) 739-2254

The Department is providing a printed set of plans and specifications available for viewing in the Bidder's Room, Transportation Administration Center, 800 Bay Road, Dover, Delaware, Monday through Friday excluding holidays from 8:00A.M. through 4:15 P.M..

### **2. QUESTIONS AND ANSWERS**

All questions pertaining to this project are to be submitted to the following e-mail address:

[dot-ask@state.de.us](mailto:dot-ask@state.de.us)

Questions and Answers will be dated and posted periodically on Delaware's Bid Solicitation Directory Website located at: <http://www.bids.delaware.gov/>

The final Questions and Answers will be posted no later than the end of the day, two working days prior to the bid date.

**All Questions and Answers posted by the Department on the above Website are included by reference and become part of the contract documents.** The awarded bidder will receive a hard copy of the final posted Questions and Answers.

Potential bidders that do not have access to the internet may contact Jim Hoagland, Contract Services Administrator, by telephone at (302) 760-2036 to make other arrangements.

**NOTE:** There is space provided on the CERTIFICATION page to insert the Posted Date of the final Questions and Answers. The Final Posted Date is the latest Posted Date of the Questions and Answers one day prior to Bid Date. **This final Posted Date must be submitted on the Certification page or your bid will be considered Non-responsive** and not considered for award.

### **3. ADDENDA**

The Department is not providing printed Addendums, if issued, for this project. **All addendums will be posted on the Department's Website, and are included by reference and become part of the contract documents.** It is the responsibility of the bidder to check the Website as needed. If there are Addendums issued, the final Addendum will be posted no later than the end of the day, two working days prior to the bid date.

**NOTE:** There is space provided on the CERTIFICATION page to insert each issued Addendum and the date you acknowledge receipt of the addendum. **Each Addendum number and date acknowledged must be submitted on the Certification page or your bid will be considered Non-responsive** and not considered for award.





### **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

**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 Project Asphalt Cement Base Price will be the anticipated Delaware Posted Asphalt Cement Price expected to be in effect at the time of receipt of bids.

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 on the basis of weight tickets and asphalt percentage from the approved job mix formula.

For Recycled Hot-Mix the asphalt percentage eligible for cost adjustment shall be only the new asphalt cement added to the mix.

There shall be no separate payment per ton (metric ton) cost of asphalt cement. That cost shall be included in the various unit prices bid per ton (metric 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 for the project will be \$571.67 per ton (\$630.16 per metric ton).

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 (1,000 metric tons) or more of hot-mix bid quantity in case of Sections 401, 402 and 403; and 15,000 gallons (60 000 liters) or more in case of Sections 304, 404 and 405.

## **401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE**

### **.01 Description.**

This item shall govern the Quality Control/Quality Assurance Testing for supplying hot-mix asphalt plant materials and constructing hot-mix asphalt pavements.

The Contractor shall be responsible for providing the quality level of materials and construction incorporated into the Contract that will meet the requirements of the Contract. The Contractor shall perform all necessary quality control inspection, sampling, and testing. The Engineer will evaluate all materials and construction for acceptance. The procedures for Quality Control and Acceptance are described in this Section.

### **.02 Definitions.**

**Acceptable Quality Level (AQL):** That level of percent within limits (PWL) to which the Engineer will consider the work completely acceptable.

**Acceptance Plan:** Factors that comprise the Engineer's determination of the degree of compliance with contract requirements and value of the product. These factors include the Engineer's sampling, testing, and inspection.

**Delaware Asphalt Pavement Association (DAPA):** The organization representing the interests of hot-mix asphalt producers and Contractors. The Engineer has a copy of the DAPA officers' names and point(s) of contact.

**Dispute Resolution:** The procedure used to resolve conflicts resulting from discrepancies between the Engineer's and the Contractor's results of sufficient magnitude to impact payment. The testing will take place at a location and time mutually agreeable by both the Engineer and the Contractor.

**Full Depth Construction** – Construction of an adequate pavement box on a subgrade and subbase prepared by the contractor

**Independent Assurance:** An unbiased and independent verification of the Quality Assurance system used, and the reliability of the test results obtained in regular sampling and testing activities. The results of Independent Assurance are not to be directly used as a basis of material acceptance.

**Job Mix Formula (JMF)/Mixture Identification (ID):** The target values for individual aggregate size gradation percentages and the asphalt percentage, the sources of each of the component materials, the proposed proportions of component materials to be used to meet those target values, the asphalt proportion, and the mixing temperature. The Engineer will assign uniquely individual mixture identification for each JMF submitted and approved.

**Lower Quality Index (QL):** The index reflecting the statistic related to the lower boundary to which a sample (or sample statistic) may deviate from the target value and still be considered acceptable.

**Mean:** A statistical measure of the central tendency – the average value.

**Operational Day:** A day in which the Engineer has approved a lane closure for the Contractor to perform work within an approved MOT plan.

**Percent Within Limits (PWL):** That amount of material or workmanship that has been determined, by statistical method, to be within the pre-established characteristic boundary(ies).

**Qualified Laboratory:** A laboratory mutually agreed upon by both DAPA and the Engineer as having proper test equipment that has been calibrated in accordance to AASHTO.

**Qualified Technician:** Personnel mutually agreed upon by both DAPA and the Engineer as having adequate training, experience, and abilities to perform the necessary testing. The minimum qualifications are either a recognized nationally accredited or certified Superpave testing certificate or been working in hot-mix asphalt testing for at least one year.

**Quality Assurance (QA):** All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.

**Quality Control (QC):** The sum total of the activities performed by the Contractor in order to assure that the product meets contract requirements.

**Quality Control (QC) Plan:** The detailed description of the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties governed by the Specifications. The QC Plan must address the actions needed to keep the process in control, detect when the process is going out of control, and responses to correct the situation(s).

**Quality Level Analysis:** A statistical procedure that provides a method for estimating the percentage of each lot or subplot of material, product, item of construction, or completed construction that may be expected to be within specified tolerances.

**Standard Deviation:** A term used in statistics to indicate the value calculated from the square root of the difference between the individual measurements in a group and their average. Standard deviation is calculated by taking the square root of the sum of the squares of the differences of each of n values and the mean value, this sum first divided by (n-1).

**Target Value:** The acceptable value for a controlling characteristic of a product. The JMF will establish each of these values for the material.

**Test Methods:** Shall be AASHTO test methods. Copies of these test methods shall be available at each qualified laboratory.

**Upper Quality Index (QU):** The index reflecting the statistic related to the upper boundary to which a sample (or sample statistic) may deviate from the target value and still be considered acceptable.

**Volumetric Properties:** Air voids, voids in mineral aggregates (VMA), voids filled with asphalt (VFA), and dust to effective asphalt.

### **.03 Equipment.**

#### **(a) Material Production Test Equipment.**

The Contractor shall 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. The Contractor shall 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 reject production. In the case of an equipment malfunction, and while waiting for repairs to equipment, the Engineer may elect to test the material at either another production facility or the Engineer's laboratory to obtain payment factors.

The following shall be the minimum calibrations for the referenced equipment:

- SUPERPAVE<sup>R</sup> 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.

#### **(b) Pavement Construction Test Equipment.**

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

### **.04 Quality Control (QC) Plan.**

#### **(a) Material Production QC.**

##### **(1) Job Mix Formula – Material Production.**

The Contractor shall submit for approval to the Engineer the job mix formula (JMF) design of the component materials and target characteristic values for each mixture proposed for use. Once the JMF is submitted to the Engineer, the Engineer will have up to three weeks to review the submitted information. However, a provision for a more timely approval is available to the Contractor; first, the Contractor shall submit the proper documentation on Pinepave mixture design software for the Engineer's approval. After that approval from the Engineer, the Contractor shall produce the new mixture for a non-Department project. The Engineer will test the material, by taking three series per the specifications. If the Engineer's test results are within the specifications, then the mixture will be approved by the Engineer for Department projects.

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 hot-mix asphalt having the specified properties. For plant component

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

The Contractor shall provide an ignition oven correction number for each JMF. The Contractor shall also supply to the Engineer weighed material of each JMF so correction numbers can be established for the Engineer's equipment for Dispute Resolution samples.

Prior to starting production of a new mixture, the Contractor shall submit a JMF. 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. In order to be approved, a re-design of the mixture will have to be completed by the Contractor for review and approval by the Engineer. The Contractor shall uniquely title each JMF. The Contractor shall submit 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.

If there is a change in the source of any of the component materials, other than asphalt, if there is a change in the proportions of the aggregate components or the percent passing for each sieve by more than 5 percent from the submitted JMF, or if there is a change in the percentage of the asphalt cement component by 0.2 percent or more, which causes the volumetrics to change from the originally submitted JMF, a new JMF is required. Also, if the asphalt cement target percentage is lowered, all volumetric criteria must still be achieved.

According to the Contractor's QC Plan, 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. The Engineer will reply to the proposed changes within one operational day and notify the Contractor of the effective date of the changes.

Although a new JMF is not required, the Contractor must notify the Engineer of any change in the proportions of the components. This notification shall include the total change made from the approved JMF proportions, and the effective time of the change.

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

**Table 1 - Aggregate Gradation - JMF and Control Point Information**

Sieves to be addressed by JMF/Range values are percentages passing by weight										
Sieve Size mm (inch)	4.75 mm	4.75mm Range	9.5 mm	9.5mm Range	12.5 mm	12.5mm Range	19.0 mm	19.0mm Range	25.0 mm	25.0mm Range
37.5(1.5)	No		No		No		No		Yes	100
25.0(1.0)	No		No		No		Yes	100	Yes	90-100
19.0 (3/4)	No		No		Yes	100	Yes	90-100	Yes	20-90
12.5(1/2)	Yes	100	Yes	100	Yes	90-100	Yes	23-90	Yes	
9.5 (3/8)	Yes	95-100	Yes	90-100	Yes	28-90	Yes		Yes	
4.75(#4)	Yes	90-100	Yes	32-90	Yes		Yes		Yes	
2.36(#8)	Yes		Yes	32-67	Yes	28-58	Yes	23-49	Yes	19-45
(#16)	Yes	30-60	Yes		Yes		Yes		Yes	
(#30)	Yes		Yes		Yes		Yes		Yes	

<b>Table 1 - Aggregate Gradation - JMF and Control Point Information</b>										
<b>Sieves to be addressed by JMF/Range values are percentages passing by weight</b>										
<b>Sieve Size mm (inch)</b>	<b>4.75 mm</b>	<b>4.75mm Range</b>	<b>9.5 mm</b>	<b>9.5mm Range</b>	<b>12.5 mm</b>	<b>12.5mm Range</b>	<b>19.0 mm</b>	<b>19.0mm Range</b>	<b>25.0 mm</b>	<b>25.0mm Range</b>
(#50)	Yes		Yes		Yes		Yes		Yes	
(#100)	Yes		Yes		Yes		Yes		Yes	
.075(#200)	Yes	6-12	Yes	2-10	Yes	2-10	Yes	2-8	Yes	1-7

## **(2) Process Control – Material Production.**

The Contractor shall submit in writing (letter or 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 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
- When the Contractor fails to comply to their approved QC Plan in reference to materials testing
- Substantial deviations to AASHTO or DelDOT procedures when running tests, sampling stockpiles, or testing hot mix.
- The use of any material not listed in the JMF.
- The use of the wrong PG graded asphalt.
- If samples fall within the Contractors action points in the QC Plan but the Contractor fails to take the corrective action in the approved QC Plan

If a Contractor is found in violation of any of these items, they will receive a written warning for their first violation. If the Contractor is found in violation a second time on any of the criteria, they will forfeit any bonus from that day's production. If the Contractor is found in violation a third time on any of the criteria, they will receive a five percent (5%) deduction for that day's production. If the Contractor is found in violation a fourth time, the plant will not be approved for production until such time that the Contractor addresses the violation of the QC plan to the satisfaction of the Engineer. If the Engineer approves the changes in advance, the Contractor may make changes to the QC Plan. All changes shall be submitted and approved in writing by the Engineer.

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, the Contractor 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.

Locations where samples will be obtained and the sampling techniques for each test

Load number of QC samples (1-10 if QA sample is not within trucks 1-10)

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 one 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 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.

#### **(b) Pavement Construction – Process Control.**

The Contractor shall perform Quality Control of pavement compaction by testing in-place pavement with a density gauge or by testing cores extracted from the pavement. The use of the nuclear density gauge shall conform to ASTM D2950; the use of other density gauges shall be as per the manufacturer's recommendations and approved by the Engineer. The Contractor may use any method to select locations for the Quality Control.

## **.05 Acceptance Plan.**

### **(a) Material Production – Tests and Evaluations.**

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. 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 Contractor shall supply, capture, and mark samples, as directed, from delivery trucks before the trucks leave the production plant. 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; if the Contractor visually observes the specified delivery truck sample and does not want this sample to be sampled and tested for acceptance, that delivery truck will not be sent to a Department project. The next visually acceptable delivery truck to the Contractor shall be sampled for acceptance testing.

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. Unacceptable samples may be a basis for rejection of material if the QC plan is not followed as approved for sample retrieval. If the Contractor wishes to perform parallel tests with the Engineer, or to capture samples to be retained for possible Dispute Resolution, each of the samples for these purposes shall be obtained at the same time and location as the acceptance test sample. Either splitting a large sample or getting multiple samples that equally represent the material is acceptable. The Engineer will perform all splitting and handling of samples after they are obtained by the Contractor.

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 2000<sup>th</sup> 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 a mixture samples using a gyratory compactor.  
AASHTO T166, Method C (Rapid Method) – Bulk specific gravity of compacted samples.  
AASHTO T308 – Asphalt cement content.  
AASHTO T30 – Aggregate gradations, using samples from the asphalt cement content test.  
AASHTO T209 – Theoretical maximum specific gravity.  
ASTM Provisional Test Method – Rapid Drying of Compacted and Loose Bituminous Asphalt Specimens using Vacuum Drying Method

**(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 using lots.

Prior to paving a road segment, the Contractor shall notify the Engineer of any locations within that road segment that may not be suitable to achieve minimum (93%) compaction due to existing conditions. The Contractor shall 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 shall include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.08 in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status.

The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.05 Acceptance Plan (a) Material Production – 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 1.5 feet from the newly placed longitudinal joint and 50 feet from a new transverse joint. If the Contractor chooses to cut companion cores, they shall be located within one foot of the Engineers cores along the longitudinal direction and in-line with the Engineers cores in the longitudinal plane.

Exactly at the locations marked by the Engineer, the Contractor shall cut a core, 6 inches in diameter, through the full lift depth. Cores submitted that are not from the location designated by the Engineer will not be tested and will be paid at zero pay.

The Contractor shall notify the Engineer prior to starting paving operations with approximations of the 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 then have 24 hours to mark the core locations. 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.

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

The Contractor shall cut each core with care in order to prevent damaging the core. The pavement shall have a maximum temperature of 140 °F when cores are cut from it. Immediately upon removal of a core from the roadway, the Contractor shall adequately label it. The Contractor shall protect the core by supplying a 6-inch plastic concrete cylinder mold, or an approved substitute, and placing the core in it. If more than one core is in the same mold, the Contractor shall place paper between them. The Contractor shall attach a completed QC test record for the representative area to the corresponding core. The Engineer will also complete a test record for areas tested for the QA report and provide to Materials & Research. At the end of every production day, the Contractor shall deliver the cores to the Engineer for testing, processing, and report distribution.

The Contractor shall repair the core hole per Appendix A, Repairing Core Holes in Hot-Mix 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) – to determine the bulk specific gravity of the cores.

AASHTO T209 – to calculate the theoretical maximum specific gravity and the density of the non-compacted mixtures.

ASTM Provisional Test Method – Rapid Drying of Compacted and Loose Bituminous Asphalt Specimens using Vacuum Drying Method.

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.

#### **.06 Payment and Pay Adjustment Factors.**

The Contractor shall 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 hot-mix asphalt. Payment to the Contractor for the hot-mix asphalt item(s) will be based on the Contract price per ton and the pay adjustments described in this specification. The Engineer will determine pay adjustments for the hot-mix asphalt item(s) based on the Acceptance Plan. The Engineer will determine both a pay adjustment for the material and a pay adjustment for the pavement construction. Note that the material portion of the total pay adjustment is 70 percent and the pavement construction portion is 30 percent. For replaced material or work, the Engineer will not apply the Pay Adjustment applicable to the material or work replaced; a new Pay Adjustment will be calculated based on the qualities of the new material. Even if one portion of the pay adjustment (material or construction) is not applied, the Engineer may apply the pay adjustment to the other portion. All adjustments (bonus or penalty) shall be paid under this item number in the contract.

**(a) Material Production – Pay Adjustment.**

The Engineer will determine the material pay adjustment by evaluating the production material based on the following parameters:

Gradation of the 2.36 mm (#8) sieve.  
Gradation of the 0.075 mm (#200) sieve.  
Asphalt cement content.  
Air void content

Using the JMF target value, the single test tolerance (from Table 3), 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):  
$$QU = ((\text{JMF target}) + (\text{single test tolerance}) - (\text{mean value})) / (\text{standard deviation}).$$
3. For each parameter, calculate the Lower Quality Index (QL):  
$$QL = ((\text{mean value}) - (\text{JMF target}) + (\text{single test tolerance})) / (\text{standard deviation}).$$
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 2 – 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:  
$$\text{PWL} = \text{PU} + \text{PL} - 100.$$
6. Calculate each parameter’s contribution to the payment adjustment by multiplying its PWL by the weight factor shown in Table 3 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.
9. For each lot, determine the final material price adjustment:

Final Pay Adjustment =

(Lot Quantity) x (Item Bid Price) x (Pay Adjustment Factor) x 70%. This final pay calculation will be paid to the tenth of a percent.

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. If the PWL of any single material characteristic is below 60, the Engineer may require the removal and replacement of the material at no additional cost to the Department.

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 out of the acceptable tolerance for any Materials pay criteria, 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.

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. If this request is approved, and the Contractor has made a change, the third load after the change will be 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.

<b>Table 2 – Quality Level Analysis by the Standard Deviation Method</b>							
<b>PU or PL</b>	<b>QU and QL for “n” Samples</b>						
	<b>n = 3</b>	<b>n = 4</b>	<b>n = 5</b>	<b>n = 6</b>	<b>n = 7</b>	<b>n = 8</b>	<b>n = 9</b>
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

<b>Table 2 – Quality Level Analysis by the Standard Deviation Method</b>							
<b>PU or PL</b>	<b>QU and QL for “n” Samples</b>						
	<b>n = 3</b>	<b>n = 4</b>	<b>n = 5</b>	<b>n = 6</b>	<b>n = 7</b>	<b>n = 8</b>	<b>n = 9</b>
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
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

<b>Table 3 - Material Parameter Weight Factors</b>		
<b>Material Parameter</b>	<b>Single Test Tolerance (+/-)</b>	<b>Weight Factor</b>
Asphalt Content	0.4	0.30
#8 Sive (19 mm or >)	7.0	0.30
#8 Sieve (12.5 mm or <)	5.0	0.30
#200 Sieve (0.075 mm) Sieve	2.0	0.30
Air Voids (4.0% Target)	1.5	0.10

<b>Table 4 - PWL Pay Adjustment Factors</b>	
<b>PWL</b>	<b>Pay Adjustment Factor (%)</b>
100	+5
99	+4
98	+3
97	+2
96	+1
95	0
94	(-1)
93	(-2)
92	(-3)
91	(-4)
PWL (when <91)	(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. Note that the material portion of the total pay adjustment is 70 percent and the pavement construction portion is 30 percent.

1. Calculate the average density values from the subplot tests values, to the nearest 0.1 unit.
2. Calculate the Degree of Compaction:  
Degree of Compaction =  
 $((\text{Core Bulk Specific Gravity}) / (\text{Theoretical Maximum Specific Gravity})) \times 100\%$ .
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 to the 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:  
Pay adjustment = (Lot Quantity) x (Bid Price) x (Pay Adjustment Factor) x 30%.

<b>Table 5: Compaction Price Adjustment Highway Locations</b>	
<b>Degree of Compaction (%)</b>	<b>Pay Adjustment Factor (%)</b>
>97	-100*
96	-3
95	0
94	0
93	+5
92	0
91	-15
90	-25
89	-30
≤88	-100*

\* or remove and replace it at Engineer's discretion

<b>Table 5a: Compaction Price Adjustment Other<sup>1</sup> Locations</b>	
<b>Degree of Compaction (%)</b>	<b>Pay Adjustment Factor (%)</b>
>96	-100*
95	-2
94	0
93	+3
92	0
91	0
90	0
89	-1

<b>Table 5a: Compaction Price Adjustment Other<sup>1</sup> Locations</b>	
<b>Degree of Compaction (%)</b>	<b>Pay Adjustment Factor (%)</b>
88	-5
87	-15
86	-25
85	-30
84	-100*

\* or remove and replace at Engineer's discretion

<sup>1</sup> 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.

### **.07 Dispute Resolution.**

Disputes or questions about any test result shall be immediately brought to the attention of the Contractor and the Engineer. When there is a significant alleged discrepancy regarding the Engineer's acceptance test results, the Contractor must claim a dispute within two operational days of the test date. 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.

For third party resolution testing, it can be either at 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 Contractor properly captured, labeled, and stored, as described in the second paragraph of the section of these specifications titled **.05 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. If the Dispute Resolution sample substantiates the original acceptance test result, the Contractor, after two such Dispute Resolution samples, will be charged a fee of \$125 for all further Dispute Resolution cores that substantiate the acceptance test result. If the Dispute Resolution sample substantiates the Contractor's test result, the Contractor will not be charged a 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.

7/28/11

**Appendix A - Repairing Core Holes in Hot-Mix Asphalt Pavement**

**Description.**

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

**Materials and Equipment.**

The following material shall be available to complete this work:

Patch Material – A 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 – Shall be mechanical, with a flat, circular tamping face smaller than 6 inches in diameter. The tamping head shall be connected to an electrical, pneumatic, or gasoline driven tamping device.

**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. 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 Hot-Mix 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:

<b>Existing Material</b>	<b>Structural Coefficient</b>
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:

$$\begin{array}{rclcl}
 \text{Existing HMA} & 2 * 0.32 & = & 0.64 \\
 \text{GABC} & 7 * 0.14 & = & \underline{0.98} \\
 & & & 1.62
 \end{array}$$

For the Type C lift the calculation would be:

$$\begin{array}{rclcl}
 \text{Newly Placed B} & 2.25 * 0.4 & = & 0.90 \\
 \text{Existing HMA} & 2 * 0.32 & = & 0.64 \\
 \text{GABC} & 7 * 0.14 & = & \underline{0.98} \\
 & & & 2.52
 \end{array}$$

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

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

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

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

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

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

401818 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 115 GYRATIONS,  
PG 64-22

401819 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS,  
PG 64-22

401820 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 205 GYRATIONS,  
PG 64-22

401821 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING

401822 - WMA, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING

401823 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS,  
PG-64-22, PATCHING

401824 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG-64-22, WEDGE

401825 - WMA, SUPERPAVE, TYPE B, 160 GYRATIONS, PG-64-22, WEDGE

401826 - WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22, (NON-CARBONATE  
STONE)

401827 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, (NON-CARBONATE  
STONE)

401828 - WMA, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 64-22, (NON-CARBONATE  
STONE)

401829 - WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22, (NON-CARBONATE  
STONE)

401830 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22, (NON-CARBONATE  
STONE)

401831 - WMA, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 70-22, (NON-CARBONATE  
STONE)

401832 - WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22, (NON-CARBONATE  
STONE)

401833 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE  
STONE)

401834 - WMA, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 76-22, (NON-CARBONATE  
STONE)

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

### **Description:**

Warm mix asphalt (WMA) is the generic term used to describe the reduction in production, paving, and compaction temperatures achieved through the application of one or more WMA technologies.

WMA 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 from a comparable mix without the Warm Mix Technology.

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.

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. The Contractor shall also be aware that the pay adjustment factors in item 401699 will be applied to the Superpave item payments to determine the bonus or penalty for the item.

### **Materials:**

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.

Conform to the requirements of Subsections 823.01, 823.05-823.17, and 823.25 - 823.28 of the Standard Specifications and the following for bituminous materials:

### **Asphalt Binder:**

The asphalt binder shall meet the requirements of Superpave performance-grade asphalt binder, as referenced in the Plans, according to M 320<sup>1</sup>, 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, $G^*/\sin(\delta)$	T 315	1.00 - 2.20 kPa
RTFO DSR, $G^*/\sin(\delta)$	T 315	$\geq 2.20$ kPa
PAV DSR, $G^* \sin(\delta)$	T 315	$\leq 5000$ kPa
BBR Creep Stiffness, $S$	T 313	$\leq 300.0$ kPa
BBR $m$ -value	T 313	$\geq 0.300$

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 RAP used, the low temperature properties, per T 313, may be different than stated in M 320 or the previous table.

**Recycled Materials:**

The percentage allowance of recycled asphalt pavement 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.

No recycled asphalt shingles shall be used in WMA.

**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 <sup>1</sup> (% MIN)		FINE AGGREGATE ANGULARITY <sup>2</sup> (% MIN)		CLAY CONTENT <sup>3</sup> (% - MIN)	FLAT AND ELONGATED <sup>4</sup> (% - MAX)
	≤ 100 mm	> 100 mm	≤ 100 mm	> 100 mm		
< 0.3	55/-	-/-	-	-	40	-
0.3 to < 3	75/-	50/-	40	40	40	10
3 to <10	85/80 <sup>5</sup>	60/-	45	40	45	
10 < 30	95/90	80/75	45	40	45	
30	100/100	100/100	45	45	50	

<sup>1</sup>Coarse Aggregate Angularity is tested according to D5821.

<sup>2</sup>Fine Aggregate Angularity is tested according to TP33.

<sup>3</sup>Clay Content is tested according to T176.

<sup>4</sup>Flat and Elongated is tested according to D4791 with a 5:1 aspect ratio.

<sup>5</sup> 85/80 denotes that 85% of the coarse aggregate has one fractured face and 80% has two or more fractured faces.

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

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

Supply all polish values to the Engineer upon request. The polish value of the composite aggregate blend 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 shall be greater than 8.0 when tested according to Maryland State Highway Administration 'MSMT 411 - Laboratory Method of Predicting Frictional Resistance of Polished Aggregates and Pavement Surfaces'. RAP shall be assigned a value of 4.0.

**Mineral Filler:**

Conform to M17.

### **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.

The contractor shall follow the manufacturer's recommendation for incorporating additives and WMA technologies into the mix. The contractor shall also 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.

### **Mixture Requirements:**

**Mix Design.** Develop and submit a job mix formula for each mixture according to R35. Each mix design shall be capable of being produced, placed, and compacted as specified. Apply all mix design requirements for Superpave to the development of the WMA mix design.

**Gradation:** The FHWA Superpave 0.45 Power Chart shall be used 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 Hot-Mix. Unless otherwise noted in the Plans, the Type C shall meet the 3/8" (9.5 mm) Nominal Maximum Aggregate Size. Type B Hot-Mix 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 T11.

Thin WMA, Type C shall be a No. 4 (4.75 mm) Nominal Maximum Aggregate Size Only.

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 T84 and T85 and reported to three decimal places along with the specific gravity of the mineral filler to be used, tested according to T100 and reported to three decimal places.

### **Superpave Gyratory Compactive (SGC) Effort:**

The Superpave Gyratory Compaction effort employed throughout mixture design, field quality control, or field quality assurance shall be as indicated below. All mixture specimens tested in the SGC shall be compacted to  $N_{Max}$ . Height data provided by the SGC shall be employed to calculate volumetric properties at  $N_{INITIAL}$ ,  $N_{DESIGN}$ , and  $N_{MAX}$ .

### **Superpave Gyratory Compactive (SGC) Effort:**

DESIGN TRAFFIC LEVEL (MILLION ESAL'S)	N <sub>INITIAL</sub>	N <sub>DESIGN</sub>	N <sub>MAX</sub>
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 (% - MINIMUM)
	N <sub>INITIAL</sub>	N <sub>DESIGN</sub>	N <sub>MAX</sub>	25.0	19.0	9.5	12.5	4.75	
	≥ 90.5								
0.3 to < 3									65.0 - 78.0
3 to < 10		96.0	≤ 98.0	12.5	13.5	15.5	14.5	16.5	65.0 - 75.0 <sup>1</sup>
10 < 30									
30	89.0								

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 effective 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 T11 and T27.

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

Note: The aggregate 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.

<b>PCS CONTROL POINT FOR MIXTURE NOMINAL MAXIMUM AGGREGATES SIZE (% PASSING)</b>					
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:**

<b>Volumetric Property</b>	<b>Superpave Criteria</b>
Air Voids ( $V_a$ ) at (%) $N_{max}$	2.0 (min)
Air Voids ( $V_a$ ) at $N_{design}$ (%)	5.5 (max)
Voids in Mineral Aggregate (VMA) at $N_{design}$	
25.0 mm Bituminous Concrete Base Course	-1.2
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	

### **Design Evaluation:**

The contractor shall furnish a Job Mix Formula (JMF) for review and approval. The Engineer may elect to evaluate the proposed JMF and suitability of all materials. 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.

### **The proposed JMF shall include the following:**

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

Plot of the three trial asphalt binder contents at  $\pm 0.5\%$  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  $N_{initial}$ ,  $N_{design}$ , and  $N_{max}$ .

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

% of  $G_{mm}$  at  $N_{design}$ , VMA at  $N_{design}$ , VFA at  $N_{design}$ , Fines to effective asphalt binder ( $P_{be}$ ) ratio, and unit weight ( $kg/m^3$ ) at both  $N_{design}$  and  $N_{max}$ .

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 T209.

The JMF shall also include the NCAT Ignition Oven calibration for the specific materials utilized for this mix.

**Construction:**

**Production Plants.** The contractor shall modify and/or operate their production plant as required by the manufacturer to introduce the WMA technology.

**Weather Limitations.** Place mix only on dry, unfrozen surfaces.

The minimum ambient temperature shall be 32 degrees F.

The following table of ambient temperatures for various binder grades and lift thicknesses for placement with the following parameters:

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

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

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

**Compaction:**

Compaction shall be tested and paid per Item 401699 - Quality Control/Quality Assurance of Bituminous Concrete .05 (b) Pavement Construction - Tests and Evaluations.

**Method of Measurement and Basis of Payment:**

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

The item 401699, will define adjustment factor to be applied to the bituminous concrete payments for bonus or penalty.

9/6/11

## **601522 - TEMPORARY PROTECTIVE SHIELD**

### **Description:**

This work consists of furnishing all material and installing a temporary protective shield at the locations described in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

### **Materials and Construction Methods:**

The Contractor shall strive to achieve total containment (100%), in order to protect the Brandywine Creek and the surrounding embankments and pedestrian and vehicular traffic on N. Park Drive and S. Park Drive against damage from falling material, debris, and other repair operations, while work is being conducted. The Contractor shall furnish and erect temporary protective structures under the work area and five feet (5 ft.) minimum beyond all sides of the structure.

Prior to commencing work the Contractor shall submit working drawings of the proposed containment system to the Department within 14 days from Notice of Award. The Department will review the drawings and evaluate the system as to its effect on the loading capacity of the existing structure. The Contractor shall also submit the design of the systems to be employed, including an analysis of the dead, live, and wind loads which will be added to the existing structure protective shields. The load analysis shall be performed and stamped by a licensed Professional Engineer registered in the State of Delaware and experienced in bridge analysis. The analysis shall assure that the system will not induce a load on the bridge which will create an overstress condition or otherwise affect the structural integrity of the bridge. It should be noted that this load analysis should take into account the need to maintain existing traffic and to provide construction access vehicles on the structure throughout the rehabilitation of the structure at the same time as the protective shields are in place. The design of the system shall take this loading condition into account. The protective shield system submittals shall include a safety net meeting OSHA requirements in 29 CFR 1926.105, 29 CFR 1926.106, and 29 CFR 1926.104. All designs shall be in accordance with the latest editions of AASHTO, including but not limited to the Bridge Design Specifications, Manual for Bridge Evaluation, Construction Handbook for Bridge Temporary Works, and Guide Design Specifications for Bridge Temporary Works, as well as all Department guidelines and manuals.

The following guidelines shall be followed by the Contractor in preparing the Scaffolding and Protective Shield Working Drawing Plans.

1. Working drawings and calculations with Professional Engineer Seal shall be submitted by the Contractor meeting the requirements of Subsection 105.04 of the Standard Specifications.
2. The working drawings shall show Scaffolding and Protective Shield system in plan & elevation views including details of clips and hangers.
3. The working drawings shall indicate maximum permissible load on the Scaffolding and Protective Shield system.
4. The working drawings shall indicate when vehicles will be permitted on the bridge and indicate allowable load and locations.
5. The working drawings shall indicate all restrictions on bridge including any load posting.
6. The working drawings shall indicate that no storing or stockpiling of construction materials will be allowed on the bridge deck or temporary scaffolding/protective shield.
7. The working drawings shall indicated a proposed sequence of construction including, but not limited to, installation of scaffolding/protective shields, pre-blasting, itemized steel repair sequence, deck milling and overlay, painting, etc.

8. Coordination of the access for the steel structure repairs and the requirements for the cleaning and painting operations will be the responsibility of the Contractor and shall be clearly stated on the working drawing submittals for each operation.

The Protective Structures shall meet with the following requirements:

1. The shields shall be supplemented with such additional suitable enclosures of tarpaulins or wire mesh as may be necessary in order to insure against the dropping of materials, tools, equipment, and other objects below the level of the shield.
2. Broken concrete, structural steel, and other debris shall not be allowed to accumulate on the shields, but shall be removed promptly. The shields shall not be used for storing or stockpiling construction materials.
3. Timber shall have an allowable flexure stress of 1600 psi and the shield must be designed for 100 psf live load (inclusive of any bridge scaffolding self-weight, rigging, equipment, material, laborers, etc.) and 65 mph wind load. If the Contractor elects to use a higher live load psf, the size of all affected members for the temporary bridge support system and any other affected members shall be increased accordingly.
4. All plywood shall be new and shall be not less than  $\frac{3}{4}$ " (19 mm) thick.
5. Bolts, nuts, washers, structural steel, etc. shall conform to Section 601 of the Standard Specifications.
6. The shield shall be assembled by means of bolts and nails, all as approved by the Engineer.
7. The flooring and siding of the shield shall have no cracks or openings through which material particles may pass.
8. All connections of the protective structures to the steel work of the existing bridge shall be made by means of clamps or other approved devices. The drilling of holes in the existing steel work, or welding thereto, will not be permitted.
9. No load shall be attached to the bridge railings/parapets (metal, concrete, or stone masonry).
10. After protective shield has served its purpose, and approval has been given by the Engineer, the Contractor shall remove and dispose of the temporary protective shield away from the site to the satisfaction of the Engineer.
11. Unless otherwise noted on the Plans, the minimum underclearance over roadways (pavement and shoulder) shall be as follows:

14.5 ft. (4.42 m) for interstate and other controlled access highways

14.0 ft. (4.27 m) for all other roadways

No portion of the temporary shield (including connection devices) shall encroach on under clearances.

**Method of Measurement:**

The quantity of temporary protective shields will be measured as the number of square feet of surface area of protective shield furnished, installed and maintained.

**Basis of Payment:**

The quantity of temporary protective shield will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for, furnishing all the materials, for design, submission of signed and sealed drawings and computations, for erection, maintenance, and removal of temporary protective shields, and for all labor, equipment tools and necessary incidentals to complete the work.

9/4/2012

**602574 - DECK REPAIR, 1/4" TO 1" DEPTH**  
**602575 - DECK REPAIR, 1" TO 3" DEPTH**  
**602576 - DECK REPAIR, 3" TO < FULL DEPTH**  
**602577 - DECK REPAIR, FULL DEPTH**

**Description:**

This work consists of the patching of deteriorated concrete below the lower limit of deck milling as shown on the Plans. The work shall also include cleaning the existing reinforcing steel of all rust and corrosion.

**Materials:**

Concrete shall be Class D.

Bonding compound shall conform to ASTM C881. Bonding compound shall be applied to existing surfaces before placing mix for patching.

Epoxy mortar shall consist of sand and epoxy, mixed by volume according to manufacturer's recommendations. The epoxy mortar shall be capable of developing a minimum compressive strength of 6500 psi (45 MPa) in 72 hours.

**Equipment:**

The equipment used shall be subject to the approval of the Engineer and shall comply with the following:

**Mechanical Scarification**

1. Sawing equipment capable of sawing concrete to a 1" (25 mm) minimum depth.
2. Power operated mechanical scarifier capable of removing not less than 1 1/4" (32 mm) of the concrete surface.
3. Shot or grit blasting equipment capable of removing rust scale and old concrete from reinforcing bars and of removing small chips of concrete partially loosened by the scarifying or chipping operation.
4. Power-driven Hand Tools for removal of unsound concrete will be permitted with the following restrictions:
  - a. "Jack Hammers" heavier than nominal 30 lbs. (14 kg) class shall not be used.
  - b. "Jack Hammers" or mechanical chipping tools shall not be operated at an angle in excess of 45 degrees measured from the surface of the deck.
  - c. "Chipping Hammers" heavier than nominal 15 lbs. (7 kg) class shall not be used to remove concrete from beneath any reinforcing bar.
5. Hand tools such as hammers and chisels shall be provided for removal of particles of unsound concrete from beneath any reinforcing bar or to achieve the required depth.

**Construction Methods:**

Before starting deck repairs the Contractor shall submit and have approved his/her plan for protecting and curing the patches. When Contract time constraints do not permit curing times as specified in Section 602, the Contractor's plan shall also detail what methods and/or materials he/she will use to attain the necessary early strength and open it to traffic on a timely manner.

After milling is complete and before any patching is commenced, the Engineer will inspect the entire exposed portion of the deck and indicate the type and extent of repair, if any, that is to be made. Deteriorated

areas of deck shall be removed down to sound concrete. Where patches over 1/4" (6 mm) in depth, measured from the milled surface of the existing bridge deck, are required, the perimeter of the patch shall be chipped down so that a 1/4" (6 mm) minimum depth vertical face from the top of the adjacent scarified deck surface exists.

After completion of removal of deteriorated concrete, if it is necessary to remove rust, oil or other foreign materials detrimental to achieving bond, detergent cleaning followed by shot or grit blasting and air blast or vacuum shall be required as determined by the Engineer.

Spalled concrete, voids and other defects which are located within the proposed concrete overlay area shall then be patched in accordance with the following:

1. For cavities not greater than 1/4" (6 mm) in depth, measured from the milled surface, no special treatment of cavity is required.
2. For cavities 1/4" (6 mm) to 1" (25 mm) in depth, measured from the milled surface, after complete cleaning, the space is to be filled with epoxy grout.
3. For cavities 1" (25 mm) to 3" (75 mm) in depth, measured from the milled surface, Contractor has the option of using (2) above or Class D mix concrete. If (2) above is used, in no case shall a patch be placed in layers exceeding 1 1/2" (38 mm) in depth. For whatever type of patch material used, wire mesh reinforcement shall be placed. Where approved by the Engineer, the mesh may be wired to existing reinforcing without the use of expansion bolts, etc. Patches less than 2 square feet (0.2 square meters) in area do not require any mesh. Contractor may use one or more of any patching material specified, provided that each total depth of a patch is made with only one type of patch material.
4. In areas where the depth of removal of deck material is over 3" (75 mm) in depth, measured from the milled surface, Class D concrete shall be placed up to the top of the milled concrete deck surface.

When the depth of removal of an existing concrete deck spanning over a roadway, waterway, or railroad reaches 1/2 of the existing concrete deck thickness and deeper removal is anticipated, the Contractor shall furnish and erect temporary protective structures under the deck to prevent any falling material from reaching the roadway, waterway, or railroad area below.

All corroded reinforcing bars shall be thoroughly cleaned by shot or grit blasting, with the exception of those that have lost 20% or more of their original dimension. These shall be cut and new bars welded in their place. Dual bars of equivalent or greater section may be used. The Engineer shall be the sole judge as to which bars are in need of repairs. Where the bond between existing concrete and reinforcing steel has been destroyed, or where more than half the diameter of the steel is exposed, the concrete adjacent to the bar shall be removed to a depth that will permit concrete to bond to the entire periphery of the bar so exposed. A minimum of 1" (25 mm) clearance shall be required, except where lower bar mats make this impractical. Care shall be exercised to prevent cutting, stretching, or damaging any exposed reinforcing steel.

Areas from which unsound concrete has been removed should be kept free of slurry produced by additional wet sawing of concrete. Work should be planned so that this slurry will drain away from all open areas. All such slurry shall be removed from prepared areas before overlay is placed.

When the deck is to receive an overlay, the surfaces of patches repaired with epoxy grout shall be shot or grit blasted to assure proper bonding with the overlay.

#### **Method of Measurement:**

The quantity of concrete deck repair will be measured as the actual number of square feet (meters) of repairs made at the various depths, complete in place and accepted.

#### **Basis of Payment:**

The quantity of concrete deck repair made at the various depths will be paid for at the Contract unit prices per square foot (meter) for the various deck repair items. Price and payment shall constitute full

compensation for removal and disposal of existing materials including damaged reinforcing bars; for furnishing, installing and removing temporary protective structures when needed; for cleaning bar reinforcement; for furnishing and placing Class D concrete, epoxy grout and wire mesh; for preparing the concrete for patching and for all labor, equipment, tools and incidentals necessary to complete the work.

Unless provided for otherwise in this Contract, installation, maintenance, and removal of temporary protective structure will be incidental to this item.

5/2/02

**602579 - DRILLING HOLES AND INSTALLING DOWELS**

**Description:**

This work consists of furnishing all materials and drilling holes for dowels or anchor bolts as required and installing the dowels or anchor bolts in place where required in the locations indicated on the Plans or as directed by the Engineer.

**Materials:**

The acrylic adhesive shall be a two component methyl methacrylate adhesive, non-sag paste, and be moisture insensitive when cured. Shrinkage during curing shall not exceed 0.002 in./in in conformance with ASTM D 2566. The minimum heat deflection temperature shall be 140°F in conformance with ASTM D 648. The product shall attain a minimum compressive strength of 10,300 psi in conformance with ASTM D 695 and be pumpable at 0°F without preheating.

**Construction Methods:**

Drill holes at the locations and to the minimum depth shown on the Plans. Hole diameters shall be drilled in accordance with the acrylic adhesive manufacturer's recommendations considering the size(s) of the dowels or anchor bolts or as shown on the Plans. Install the dowels or anchor bolts in place using the acrylic adhesive in a manner to complete bonding of the dowels or anchor bolts in the holes and in accordance with manufacturer's recommendations. Repair any damage to the existing structure to remain caused by the drilling operations to the satisfaction of the Engineer at no additional cost to the Department.

**Method of Measurement:**

The quantity of drilling holes and installing dowels will be measured as the actual number of each hole drilled, dowel or anchor bolt installed, and accepted.

**Basis of Payment:**

The quantity of drilling holes and installing dowels will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing all materials, for all labor, equipment, tools, and all necessary incidentals to complete the work. Dowels and/or anchor bolts will be measured and paid for under a separate item(s) unless indicated otherwise on the Plans.

3/02/2012

**602580 - PARTIAL REMOVAL OF PCC MASONRY**

**Description:**

Removal of portion of existing Portland cement concrete structure shall consist of removing portions or all of the Portland cement concrete deck at the joints, abutment backwalls at the joints, etc., and all incidentals as specifically indicated on the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

Epoxy coating for bar reinforcement shall be in accordance with Section 604 of the Standard Specifications.

**Construction Methods:**

The method of removal employed must meet the approval of the Engineer. The technique chosen must not be detrimental to the remaining structure. Pneumatic hammers, if used, shall not exceed 16 lb (7 kg) unless specified otherwise on the Plans.

During removal operations, the Contractor shall make full provisions for maintenance and protection of vehicular traffic. All removed material shall become the property of the Contractor and shall be removed from the site and disposed of on spoil areas approved by the Engineer.

All bar reinforcement, exposed during the removal of the concrete and intended for re-use in the new construction, shall be thoroughly cleaned of rust and other foreign material by shot or grit blasting to the satisfaction of the Engineer. The bars to remain shall then be epoxy coated in accordance with Section 604 of the Standard Specifications. There shall be no separate payment for such work, and the cost shall be included in the item. After removal of all concrete as required, the remaining concrete surface shall be thoroughly cleaned with oil-free compressed air.

The use of explosives is not permitted.

**Method of Measurement:**

The quantity of removed existing Portland cement concrete will be measured as the number of cubic yards (cubic meters) of concrete removed as directed on the Plans or by the Engineer.

**Basis of Payment:**

The quantity of removed existing Portland cement concrete will be paid for at the Contract unit price per cubic yard (cubic meter). Price and payment shall constitute full compensation for removal and disposal of portions of existing concrete structures as applicable and required above, surface preparation including airblast cleaning, shot or grit blast cleaning of reinforcement bars, epoxy coating of reinforcement bars, and for all labor, equipment, tools, and incidentals necessary to complete the work.

3/02/2012



**602586 - REHABILITATION OF CONCRETE STRUCTURE**

**Description:**

This work consists of preparation and furnishing all materials, and repairing portions of the existing concrete substructure and/or superstructure in accordance with the notes and details on the Plans and as directed by the Engineer.

All applicable requirements of Section 602 of the Standard Specification for performing the work under this item shall be applicable except as modified herein.

**Materials:**

Concrete for repair work shall consist of a mixture of Portland Cement, aggregate, water, and other admixtures to provide a workable concrete. The Contractor has the option of using either Class A Concrete, Micro-Silica Modified Concrete, or Latex Modified Concrete for this item. The minimum concrete temperature at the time of placement shall be 75 F (24 C). The mix shall have a minimum compressive strength of 2000 psi (15 MPa) in 6 hours, if required in the Plans, and 4500 psi (30 MPa) in 28-days. The following shall be included in the Portland Cement Concrete mixture composition supplied by the Contractor:

Coarse Aggregate - Del. No. 8 Stone meeting the grading requirements of Section 813

Coarse Aggregate/Sand Ratio - 50 to 60%

Portland Cement Type I - 705 lb/yd<sup>3</sup> (418 kg/m<sup>3</sup>) [Min.]

Water/Cement ratio - 0.45 (Max.)

Slump - 3" - 6" (75 to 150 mm)

Air - 5 % to 8%

Admixture - The quantity and AASHTO type or combination of AASHTO types of admixtures shall be determined by the Contractor.

If the Contractor chooses to use Class A concrete, the concrete shall have materials present in the mixture to mitigate alkali-silica reactivity (ASR) as per Section 812. Also, accelerators, if used, shall be non-chloride based.

If the Contractor chooses to use Micro-Silica Modified Concrete, the Micro-Silica shall conform to the requirements of AASHTO M307. If the Contractor chooses Latex Modified Concrete, the Latex Modifier shall be non-toxic, film forming, polymeric emulsion to which all stabilizers have been added at the point of manufacture, and shall be homogeneous and uniform in composition.

The Contractor shall be responsible for the quality of the concrete placed in any weather or atmospheric conditions. A smooth, durable riding surface of uniform texture, true to the required grade and cross-section, shall be obtained.

If Class A Concrete is utilized, prior to concrete placement, an approved bonding agent shall be applied to the existing concrete to ensure proper bond. If either the Micro-Silica Modified Concrete or the Latex Modified Concrete are utilized, the bonding agent shall be the rehabilitation concrete grout, placed and brushed into the rehabilitation areas. The grout shall be scrubbed onto the rehabilitation areas with enough care to ensure that all surfaces are evenly covered and that excess grout will not collect in low area.

Reinforcement, if required, shall be as indicated on the Plans.

**Construction Methods:**

All deteriorated, loose, and honeycombed concrete, as determined by the Engineer, shall be removed from the surface areas to be repaired with a pneumatic hammer. Unless specified otherwise on the Plans, the size of the hammer shall be 15 lb (7 kg). maximum for superstructure repair and 30 lb (14 kg). maximum for substructure repair.

All bar reinforcement exposed during the removal of the concrete shall be thoroughly cleaned of rust and other foreign material by abrasive grit (use non silica, low dusting abrasive) blasting and then cleaned with a stream of compressed air before starting any repair work. In the case of damaged bar, it shall be cut and

mechanically spliced or replaced with a new bar of the same size and lapped or field-welded to the ends of the existing bar to the satisfaction of the Engineer. There shall be no separate payment for such work, and the cost shall be included in the item except that the new reinforcing bar will be paid for separately under a separate item in this Contract.

The Contractor shall submit to the Engineer a drawing showing details of forms and support system with appropriate dimensions for approval prior to the placing of concrete to repair the structure.

Concrete shall not be allowed to drop from the top of the forms which could otherwise result in the separation of the mix. Only approved mixing and placing equipment shall be used in preparation and handling of the concrete. Oil and other rust inhibitors shall be removed from all equipment in contact with the concrete before the mixes are used.

**Method of Measurement:**

The quantity of rehabilitation of concrete structure will be measured as the number of cubic feet (cubic meters) of concrete placed for the purpose of structure rehabilitation and accepted.

**Basis of Payment:**

The quantity of rehabilitation of concrete structure will be paid for at the Contract unit price per cubic feet (cubic meter). Price and payment will constitute full compensation for furnishing and placing all materials including concrete, abrasive grit blast cleaning of reinforcement bars, splicing and/or replacement of existing reinforcement bars, removal and disposal of deteriorated concrete, placement and removal of formings, surface preparation, for submission of working drawings, and all other work as described herein and on the Plans, for all labor, tools, equipment, and necessary incidentals to complete the work but shall not constitute payment for new bar reinforcement which shall be paid for under a separate item of this Contract.

3/14/02

**602611 - REPAIR OF CONCRETE STRUCTURES BY EPOXY INJECTION**

**Description:**

This work consists of furnishing all materials and repairing cracks in existing concrete structures by means of an epoxy injection system in accordance with the notes and details on the Plans and as directed by the Engineer.

**Materials:**

The epoxy injection system shall consist of a non-sag epoxy bonder to seal the surface cracks, and an injection epoxy used under low pressure to penetrate and fill the cracks, and bond the crack surfaces together.

The epoxy injection system shall be MARK-8 Non-sag epoxy bonder and Mark 10 injection epoxy manufactured by POLY-CARB, or NO. 22 Epoxy Paste and NO. 4 Eva - Pox manufactured by E-poxy Industries, Inc., or Duralcrete Gel and Duralcrete LV injection epoxy manufactured by Dural International Corporation, or Sikadur 31 Hi-Mod Gel and Sikadur 35 Hi - Mod LV injection epoxy, manufactured by Sika Corporation, or Nitobond Epoxy Gel and Nitobond ULV manufactured by Fosroc, Inc., or Approved equal. The Contractor shall furnish a copy of the comprehensive preparation and application instructions prior to the actual application, which have been developed by the manufacturer for use with the proposed epoxy bonder and epoxy injection system.

**Construction Methods:**

Concrete surfaces adjacent to the cracks to be repaired shall be cleaned to the extent necessary to achieve an adequate bond with epoxy bonder, and only by approved procedures which will not cause abrasive grit or concrete dust to get into the cracks. The use of solvents or thinners in cracks or on the bonding surfaces will not be permitted.

Dimensions of epoxy bonder to be used to seal the cracks shall be a maximum of 1/16" (1.5 mm) thick and 1" (25 mm) wide. Cracks to be injected shall have injection ports or tees installed in them. Unless otherwise specified on the Plans or directed by the Engineer, injection ports or tees shall be spaced at 6" (150 mm) to 12" (300 mm) for vertical repair and 6" (150 mm) to 18" (450 mm) for horizontal repair, but in no case closer together than the thickness of the concrete member if full depth penetration is desired. However, in certain cases, depth and spacing of holes at injection ports or tees shall be established with due consideration of the crack widths and depths compatible with flow characteristics of the epoxy and injection pressure to ensure that no further damage will be done to the member being repaired.

Ports or tees shall be set in dust free holes made either with vacuum drills or chipping hammers. After injection ports or tees have been inserted into the holes, all surface cracks in the area to be repaired shall be sealed with epoxy bonder between ports to ensure retention of the pressure injected epoxy within the confines of the member. The application of epoxy bonder shall be limited to clean and dry surfaces, and substrate temperatures shall be limited to not less than 50° F (10° C) during epoxy application.

The Contractor shall follow the manufacturer's recommendations for surface preparation, mixing of the components of the bonder epoxy and injection epoxy system, surface sealing and applications and all other works. If there is conflict between these specifications and the manufacturer's recommendations, the latter will prevail.

**Method of Measurement:**

The quantity of epoxy injection will be measured as the number linear feet (linear meters) of cracks injected and accepted. The non-sag epoxy bonder for sealing the crack surface areas shall not be measured and the cost shall be included in the unit price bid for this item.

**Basis of Payment:**

The quantity of epoxy injection will be paid for at the Contract unit price per linear foot (linear meter). Price and payment shall include full compensation for furnishing all materials, surface preparation, application, cleaning the areas of spills and other contaminates, abrading the concrete surface areas, for all tools, equipment, labor, and all necessary incidentals to complete the work.

3/15/02

**602646 - SILICONE ACRYLIC CONCRETE SEALER**

**Description:**

This work consists of surface preparation, furnishing all materials, and application of a silicone acrylic concrete sealer to any concrete surface. The work shall be performed as indicated on the Plans, in accordance with these Specifications, and as directed by the Engineer.

**Materials:**

The concrete sealer shall consist of methyl methacrylate-ethyl acrylate copolymer resins and toning pigments suspended in solution of all times by a chemical suspension agent and solvent. Laminar silicates, titanium dioxides, and inorganic oxides may be used for toning pigments. Use of vegetable or marine oils, paraffin materials, stearates or organic pigments in the formulation shall not be permitted.

The Sealer shall be opaque, non-film forming, and penetrating silicone acrylic compound. The sealer shall pass NCHRP 244 Series-2, salt spray resistance requirements. The materials must be local OTC-VOC compliant.

The contractor shall provide Materials and Research Section one (1) quart sample from each batch of the silicone acrylic sealer compound supplied for chemical identification and testing.

The manufacturer shall supply a Materials Safety Data Sheet and a letter of certificate compliance of batch & lot of each shipment of the concrete sealer materials. The contractor shall also provide a manufacturer analysis report of the materials used with the specified batch shipped to the job site.

The color of the compound shall be off white (Federal Color #37925 of FED-STD-595B) or as specified on the plans.

**Surface Preparation:**

All new concrete surfaces, texturing, saw cutting, repointing and grooving shall be completed before the surface is prepared for sealer. All concrete that is to be sealed shall be cured for at least 28 days after casting or for the length of time specified in the manufacturer's instruction, which ever is longer. After 28 days, concrete surface shall be lightly sand or shot blasted, followed by vacuum cleaning in accordance with ASTM D 4258 & SSPC-SP-13 requirement to completely remove any applied curing compound, and to make surface lightly rough for penetration of sealer.

For existing concrete, all previous sealers and paints, all salt, efflorescence, laitance, and other foreign matter, and all loose material shall be completely removed using one or a combination of different preparation methods as specified in ASTM D-4258 and SSPC-SP 13.

In addition, both new and existing concrete shall receive a high pressure (3000-5000 psi) water washing at a flow of more than 4 gallons per minute, with zero degree of rotary nozzle. The contractor shall also allow the surface to dry for a minimum of 24 hours prior to the coating application after high-pressure washing. All surface preparation work shall be completed and approved by the Engineer before sealer the application can commence.

**Construction Methods:**

The sealer shall be used as supplied by the manufacturers without thinning or alteration unless specifically required in the manufacturer's instructions and verified by Engineer.

The silicone acrylic concrete sealer shall be applied to all exposed concrete surfaces as shown on the plans.

Concrete curing compounds, form release agents, and concrete hardeners may not be compatible with recommended coatings. Check for compatibility by applying a test patch of the recommended coating system, covering at least 20 to 30 square feet.

The concrete sealer material shall be applied using coverage rate and equipment in accordance with the manufacturer's recommendations.

A minimum of two coats shall be applied; all applications shall be performed under dry conditions with application-spread rate as recommended by the manufacturers.

The sealer shall be applied within the ambient temperature range as recommended by the manufacturer, when no rain is expected within a minimum of 12 hours following the application, and there are no high winds that would cause an improper application. If rain has preceded the application, the surface shall be allowed to dry at least 24 hours before waterproofing application begins.

Follow manufacturers recommendation for coating thickness. No drips, runs, or sags will be allowed during application. Natural bristle brush, roller, or spray can be used to perform the application. Follow manufacturers recommendation during application. No thinning of materials is permitted; all application procedures, and drying time between coats must be as per manufacturers recommendations.

The Contractor shall perform surface preparation and application of the concrete sealer material so as not to endanger any private and/or public property, pedestrians, workmen, and vehicles on, beneath or adjacent to the structure.

**Method of Measurement:**

The quantity of "Silicone Acrylic Concrete Sealer" will be measured by the square feet of area treated and accepted.

**Basis of Payment:**

The quantity of "Silicone Acrylic Concrete Sealer" will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for furnishing all materials, furnishing and removing scaffolding as required, surface preparation, application of the concrete sealer material, disposal of discarded materials, and for all labor, tools, equipment, and all necessary incidentals to complete the work.

2/1/07

**602733 – POLYESTER POLYMER CONCRETE OVERLAY****Description:**

This work shall consist of furnishing and placing a polyester polymer concrete (PPC) overlay with a high molecular weight methacrylate (HMWM) resin prime coat where specified in the Plans. The work shall also include the preparation of all receiving surfaces. All work shall be in accordance with the Plans, System Provider's recommendations, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

All material components of the overlay system must be provided by a single System Provider to ensure compatibility of all overlay system components. The System Provider shall be able to demonstrate experience successfully supplying projects of similar size and scope.

Material requirements for the PPC overlay are as follows:

**1. Primer**

The prepared surface shall receive a wax-free low odor, HMWM resin prime coat conforming to the following:

<b>High Molecular Weight Methacrylate (HMWM) Resin</b>		
<b>Property</b>	<b>Requirement</b>	<b>Test Method</b>
Volatile Content*	30 percent, maximum	ASTM D 2369
Viscosity* (Brookfield RVT with UL adapter, 50 RPM at 25 degrees C)	25 cps, maximum	ASTM D 2196
Specific Gravity* (at 77 degrees F)	0.90 - 1.10	ASTM D 1475
Flash Point*	180 degrees F, minimum	ASTM D 3278
Vapor Pressure* (mm Hg at 77 degrees F)	1.0	ASTM D 323
Tack Free Time (minutes at 77 degrees F)	400 minutes, maximum	ASTM C 679
PCC <sup>a</sup> Saturated Surface-Dry Bond Strength (at 24 hours at 70 ± 2 degrees F)	500 psi, minimum	California Test Method 551
Thermal compatibility	No delamination of overlay	ASTM C 884

\*Tested prior to adding initiator

<sup>a</sup> PCC = Portland cement concrete

The prime coat promoter/initiator shall consist of a metal drier and peroxide. If supplied separately from the resin, **at no time shall the metal drier be mixed directly with the peroxide.** The containers shall be stored in a manner that will not allow leakage or spillage from one material to contact the containers or material of the other.

**NOTE: Mixing the metal drier directly with the peroxide will result in a violent exothermic reaction.**

**2. Aggregate**

Aggregate for polyester polymer concrete and abrasive finishing sand shall conform to the following gradation requirements:

<b>Combined Aggregate</b>		
<b>Sieve Size</b>	<b>3/8" Max. Percent Passing</b>	<b>#4 Sieve Max. Percent Passing</b>
1/2"	100	100
3/8"	83-100	100

#4	65-82	62-85
#8	45-64	45-67
#16	27-48	29-50
#30	12-30	16-36
#50	6-17	5-20
#100	0-7	0-7
#200	0-3	0-3

Aggregate retained on the #8 sieve shall have a maximum of 45 percent crushed particles when tested in accordance with AASHTO Test Method T 27. Fine aggregate shall consist of natural sand only.

The minimum Mohs scale hardness of the silica sand shall be 7.0, and all aggregates retained in the No. 8 sieve shall have a minimum hardness of 7.0.

Aggregate absorption shall not exceed one percent (1%) as determined by AASHTO Test Methods T 84 and T 85.

At the time of mixing with the resin, the moisture content of the aggregate, as determined by AASHTO Test Method T 255, shall not exceed one half of the aggregate absorption.

Sand for abrasive sand finish shall be commercial quality blast sand having at least 95 percent passing the No. 8 sieve and at least 95 percent retained on the No. 20 sieve and conform to the dryness requirements for polyester concrete aggregate as specified in this special provision.

### 3. Polyester Resin Binder

The polyester polymer concrete shall consist of polyester resin binder and dry aggregate. The resin shall be an unsaturated isophthalic polyester-styrene co-polymer conforming to the following:

Polyester Resin Binder		
Property	Requirement <sup>a</sup>	Test Method
Viscosity* (RVT No. 1 Spindle, 20 RPM at 25 degrees C)	75 to 200 cps	ASTM D 2196
Specific Gravity*	1.05 to 1.10 at 77 degrees F	ASTM D 1475
Elongation	35 percent, minimum Type I at 0.45"/minute Thickness = 0.25" ± 0.03"	ASTM D 638
	Sample conditioning: 18/25/50 + 5/70	ASTM D 618
Tensile Strength	2500 psi, minimum Type I at 0.45"/minute Thickness = 0.25" ± 0.03"	ASTM D 638
	Sample conditioning: 18/25/50 + 5/70	ASTM D 618
Styrene Content*	40 percent to 50 percent (by weight)	ASTM D 2369
Silane Coupler	1.0 percent, minimum (by weight of polyester styrene resin)	
PCC <sup>b</sup> Saturated Surface Dry Bond Strength	500 psi, minimum at 24 hours and 70 ± 2 degrees F	California Test Method 551
Thermal Compatibility (mixed with aggregate)	No delamination of overlay	ASTM C 884

\*Tested prior to adding initiator

<sup>a</sup> Values are based on specimens or samples cured or aged at 77 degrees F unless otherwise indicated.

<sup>b</sup>PCC = Portland cement concrete

The silane coupler shall be an organosilane ester, gamma-methacryloxypropyltrimethoxysilane. The promoter shall be compatible with methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. The promoter shall be compatible with suitable peroxide initiators.

#### **4. Samples**

Samples of materials for all components of the overlay system shall be submitted by the System Provider to the Materials and Research Section a minimum of five (5) days prior to the overlay application. Samples shall be representative of the materials to be used in the overlay application and shall consist of a one gallon (1 gal.) sample for each liquid component (HMWM resin primer and polyester resin binder) and a five pound (5 lb.) sample for each dry component. Appropriate amounts of catalysts and promoters shall be supplied with the one gallon samples.

#### **5. Packaging and Shipment**

A Material Safety Data Sheet shall be furnished prior to use for each shipment of polyester resin binder and HMWM resin. All components shall be shipped in strong, substantial containers, bearing the System Provider's label specifying date of manufacture, batch number, brand name, quantity, and date of expiration or shelf life. In addition, the mixing ratio shall be printed on the label of at least one (1) of the system components. If bulk resin is to be used, the Contractor shall notify the Engineer in writing ten (10) days prior to the delivery of the bulk resin to the job site. Bulk resin is any resin that is stored in containers in excess of 55 gallons.

#### **6. Basis of Acceptance**

Project acceptance of the PPC overlay materials will be based on the following:

1. Delivery of the PPC overlay materials to the project site in acceptable containers bearing all the label information as required above in Packaging and Shipment.
2. Receipt of a Manufacturer's certification stating the primer, aggregate and polyester resin binder meet the material requirements of items 1 through 3 above.
3. Approval by the Materials and Research Section based on conformance with the material requirements above.

#### **Submittals:**

Prior to construction of the PPC overlay, the Contractor shall submit to the Department a Work Plan for constructing the PPC overlay. The Work Plan shall include, but not be limited to, the following:

1. A schedule and sequence of all overlay work
2. Technical literature from the System Provider including requirements for storage, handling, mixing, application, cleanup, and disposal of materials and containers
3. Description of materials and test reports for all overlay system materials to be used
4. Description of equipment for applying HMWM resin
5. Description of equipment for measuring, mixing, placing, and finishing PPC overlay material
6. Method for isolating bridge joints
7. Location of proposed cold joints in PPC overlay
8. Cure time for PPC overlay
9. Description of equipment for applying sand
10. Procedures for surface preparation, application, curing, and finishing

In addition, the System Provider's technical representative who will be on site shall also review and approve the plan. Any deviations from the approved Work Plan shall be approved by the Engineer.

#### **Construction Methods:**

##### **A. General**

The System Provider's technical representative shall be made available on the job site for a minimum of two (2) working days to make recommendations to facilitate the PPC overlay installation. This shall include, but not be limited to, surface preparation, PPC overlay application, and PPC overlay curing.

During surface preparation and PPC overlay application, precautions shall be taken to assure that traffic is protected from rebound, dust and construction activities. Appropriate shielding shall be provided as required and directed by the Department.



During PPC overlay application, the Contractor shall provide suitable coverings (e.g. heavy duty drop cloths) to protect all exposed areas not to be overlaid, including, but not limited to, curbs, sidewalks, parapets, etc. All damage to the existing structure to remain as a result of the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Engineer and the Department at no additional cost to the Department.

## **B. Storage of Materials**

All materials shall be stored and handled in accordance with the System Provider's recommendation to ensure their preservation. Applicable fire codes may require special storage facilities for some components of the PPC overlay system.

## **C. Equipment**

Equipment shall be fitted with suitable traps, filters, drip pans, or other devices to prevent oil, fuel, grease, or other deleterious material from being deposited on the deck

1. Surface Preparation. All equipment to be used for surface preparation shall be as specified by the PPC overlay System Provider and approved by the Engineer. Unless otherwise specified, the Contractor shall use automatic shot blasting units to clean pavement surfaces. In those areas not accessible to this machinery, the surface may, with the Engineer's approval, be cleaned with blast cleaning equipment.

Automatic shot blasting units shall be self propelled and include a vacuum to recover spent abrasives. The abrasive shall be steel shot. Magnetic rollers shall be used to remove any spent shot remaining on the deck after vacuuming.

2. Application. Polyester polymer concrete shall be mixed in mechanically operated mixers. Mixer size shall be sufficient for complete mixing of batch and shall be approved by the System Provider's technical representative and the Engineer. The binder shall be initiated and thoroughly blended just prior to mixing with aggregate. The polyester polymer concrete shall be mixed a minimum of two (2) minutes prior to placement.

A continuous mixer employing an auger screw/chute device with self-contained, separate aggregate, resin, and peroxide compartments may be used. The continuous mixer shall 1) be equipped with a metering device that automatically measures and records the aggregate volumes and the corresponding resin volumes and 2) have a readout gage, visible to the Engineer at all times, that displays the volumes being recorded. The volumes shall be recorded at no greater than five (5) minute intervals along with the time and date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each work shift.

A minimum of four (4) Class B fire extinguishers, five pound (5 lb.) minimum, in good working order shall be mounted approximately equidistant around the perimeter of each mixer unit. The capacity, operating speed, and all mix control constants shall be clearly and prominently mounted on the unit by the System Provider in a durable metal plate or plates.

3. Finishing and Texturing. Finishing shall be performed using a vibratory-type mechanical screed riding on preset forms/rails or through the use of a PPC paver.

Texturing shall be performed in accordance with DelDOT Standard Specifications Subsection 602.20(c)(1) Mechanical Grooving.

## **D. Surface Preparation**

All structural slab, curb and parapet surfaces that will be in contact with the overlay shall be prepared as follows:

1. The Contractor shall determine the size of shot, flow of shot, forward speed of shot blast machine and number of passes necessary to provide a surface capable of a tensile bond

strength greater than or equal to 250 psi or a failure area, at a depth of 0.25" or more into the base concrete, greater than 50% of the test area. The acceptance testing shall be performed by the Department per ACI 503R-93, Appendix A of the *ACI Manual of Concrete Practice*. The Engineer will designate the location of the test patches. A test result shall be the average of three (3) tests on a test patch of not less than 4.5 square feet. A minimum of one (1) test result shall be obtained for each bridge. Additional test patches may be required, up to one (1) in each bridge span, as specified by the Materials and Research Section. The test patches shall be located to provide for the evaluation of the range of surface conditions on the bridge, and one or more patches shall be placed on deck repairs. Test patches shall be installed at the same thickness, and with the same materials, equipment, personnel, timing, sequence of operations, and curing period that will be used for the installation of the overlay. The cleaning practice, materials, and installation procedure will be approved if one passing test result is obtained from each test area when tested at an age of 24 hours or more. Tensile adhesion tests shall not be performed at surface temperatures above 80degrees F.

Before application of the primer, the entire deck surface shall be cleaned by shot blasting and other means using the approved cleaning practice to remove any epoxy resins, asphaltic material, oils, dirt, rubber, curing compounds, paint, carbonation, laitance, weak surface mortar and other potentially detrimental materials, which may interfere with the bonding or curing of the overlay.

If the Engineer determines that an approved cleaning practice has changed prior to the completion of the PPC overlay application, the Contractor must return to the approved cleaning methods and re-clean the suspect areas or verify through tests at no additional cost to the Department that the practice is acceptable.

All patching and cleaning operations shall be inspected and approved prior to placing the PPC overlay. Any contamination of the deck after initial cleaning shall be removed. The entire PPC overlay system shall be applied following the cleaning and prior to opening the bridge to traffic.

Cleaned pavement surfaces shall not be exposed to vehicular or pedestrian traffic other than that required by the PPC overlay operation. If the pavement is contaminated before being overlaid it shall be re-cleaned by abrasive blasting to the satisfaction of the Engineer. No additional payment will be made for re-cleaning work.

The concrete shall be dry at the time of application of the HMWM primer. If deemed necessary, the Department shall test for the presence of deck moisture in accordance with ASTM D 4263. The Contractor's means and methods shall allow for placement of the primer within 24 hours of surface cleaning. Dryers shall be used, as necessary, to facilitate the timely placement of the HMWM primer and PPC overlay materials.

2. All steel surfaces that will be in contact with the overlay shall be cleaned in accordance with SSPC-SP No. 10, Near-White Blast Cleaning, except that wet blasting methods shall not be allowed.

After the cleaning operation is completed there shall be no visible evidence of oil, grease, dirt, rust, loose particles, spent abrasives or other foreign material on any of the surfaces to be overlaid.

## **E. Application**

1. Prime Coat

Prior to applying the prime coat, the area shall be dry and shall be blown clean with oil-free compressed air. The surface temperature during application and curing shall satisfy the System Provider's requirements.

The prime coat shall be uniformly applied to completely cover the surface to receive the PPC overlay. The rate of spread shall be approximately 1.4 ounces per square foot of deck surface

or as recommended by the System Provider. The prime coat shall be allowed to cure a minimum of 15 minutes before placing polyester polymer concrete.

## 2. Polyester Polymer Concrete

### Test Patches

Prior to constructing the PPC overlay, one (1) or more trial overlays shall be placed on a previously constructed concrete base to determine initial set time and to demonstrate the effectiveness of the mixing, placing, and finishing equipment proposed as well as curing period. Each trial overlay shall be the same width as the normal single-lane paving width, at least six feet (6 ft.) long and the same thickness as the PPC overlay to be constructed. Conditions and equipment used during the construction of the trial overlay shall be similar to those expected and to be used for the construction of the permanent PPC overlay. If the cleaning practice, materials and installation procedure are not acceptable, the Contractor must remove the failed test patches and make the necessary adjustments and retest all test areas at no additional cost to the Department until satisfactory test results are obtained.

The test patch shall have minimum bond strength of 250 psi as determined by ACI 503R-93, Appendix A to assure that the overlay adheres to the prepared surface. Adhesion testing required for acceptance shall be performed by the Department.

All material used in the trial overlay, including the test patches, shall become the property of the Contractor and shall be removed (if required) and disposed of at the Contractor's expense.

Calibration and general mixer operation shall be demonstrated on-site a minimum of five (5) working days prior to anticipated use. The calibration will consist of a weight/volume determination made in a 0.25 cubic yard container, filled with the polyester polymer concrete to be used, struck off, and the volume compared to the mixer output record or reading. When no longer required, as determined by the Engineer, the container and contents shall become the property of the Contractor and shall be disposed of at the Contractor's expense.

The polyester polymer concrete shall be placed within 120 minutes after the prime coat has been applied.

The polyester polymer concrete shall contain approximately 12 percent polyester resin by weight of dry aggregate; the exact percentage is dependent on the aggregate chosen and will be determined by the System Provider's technical representative during placement to enable proper finishing and texturing of the overlay surface.

The target nominal thickness for the polyester polymer overlay shall be as shown in the Plans with a minimum final in-place overlay thickness as shown in the Plans over all finished deck surfaces receiving an overlay.

Termination edges of the overlay may require application and finishing by hand trowel due to obstructions such as a curb. All hand troweling shall be followed by broadcasting aggregate or surface texturing while the resin is still wet to provide acceptable surface friction characteristics.

When multiple passes of the screed or paver are required to overlay the full bridge width, longitudinal termination edges shall be located at the edge of travel lane(s) and/or within two feet (2 ft.) of the curblines.

All expansion joints shall be adequately isolated prior to overlaying.

The amount of initiator used in the polyester polymer concrete shall be sufficient to produce an initial set time between 20-120 minutes during placement. The initial set time will be determined by using an initial-setting time Gillmore needle in accordance with the requirements of ASTM C 266. Accelerators or inhibitors may be required to achieve proper set times and shall be used as recommended by the resin System Provider.

The resin binder shall be initiated and thoroughly blended just prior to mixing with aggregate. The polyester polymer concrete shall be mixed a minimum of two (2) minutes prior to placing.

Polyester polymer concrete shall be placed prior to gelling and within 15 minutes following the addition of the initiator, whichever occurs first. Polyester polymer concrete that is not placed within this time shall become the property of the Contractor and shall be disposed of at the Contractor's expense. Placing includes the broadcasting of finish sand, see below.

The surface temperature of the area to receive polyester concrete shall be the same as specified above for the prime coat and shall satisfy the System Provider's recommendations.

The finishing equipment used shall strike off the polyester polymer concrete to the established grade and cross section. Finishing equipment shall be fitted with vibrators or other means of consolidating the polyester polymer concrete to the required relative compaction of not less than 97 percent in accordance with California Test Method 552. Compaction testing required for acceptance shall be performed by the Department as deemed necessary by the Department.

The surface shall be textured with an abrasive sand finish. The finish sand shall be applied by either mechanical means or hand broadcasting immediately after strike-off, before gelling occurs, at a minimum rate of 2.75 ounces per square foot.

#### **F. Surface and Thickness Requirements**

The smoothness of the polyester polymer concrete surface will be tested with a straightedge. The surface shall not vary more than 0.25" from the lower edge of a  $12.0 \pm 0.2$  foot long straight edge placed in any direction. Any surfaces which fail to conform to the required tolerances shall be removed by grinding.

To ensure adequate pavement friction, the completed PPC overlay surface shall be free of any smooth or "glassy" areas such as those resulting from insufficient quantities of surface aggregate. Any such surface defects shall be repaired by the Contractor in the manner recommended by the System Provider and approved by the Engineer at no additional cost to the Department.

The minimum thickness of the PPC overlay as shown in the Plans shall be checked prior to its initial set using a ruler. If the Engineer determines that the minimum thickness has not been attained, the limits of the deficient area shall be documented and an additional layer of PPC shall be applied after the deficient area of PPC overlay hardens. The thickness of this additional layer of PPC shall be as specified by the System Provider and as required to achieve the minimum total PPC overlay thickness specified in the Plans. Any additional PPC overlay needed to satisfy the minimum thickness requirement shown in the Plans shall be applied by the Contractor at no additional cost to the Department.

#### **G. Curing**

Traffic and equipment shall not be permitted on the PPC overlay for a minimum of four (4) hours following final finishing. The PPC overlay shall be protected from moisture for not less than four (4) hours after finishing. The PPC overlay shall be allowed to reach sufficient cure, as specified by the System Provider, before subjecting it to traffic loads. Cure time is dependent upon the ambient and deck temperatures. Actual degree of cure and suitability of the PPC overlay for traffic shall be as determined by the Engineer.

#### **Method of Measurement:**

The quantity of PPC overlay shall be measured by area and depth in square yard-inch. The actual area and depth finished and accepted will be measured, exclusive of the areas of concrete joint headers and joint openings.

#### **Basis of Payment:**

The quantity of "Polyester Polymer Concrete Overlay" will be paid for at the Contract unit price per square yard-inch for furnishing of PPC material, surface preparation, primer, placement of PPC overlay, and finishing. Price and payment shall include full compensation for furnishing all material for the polyester

polymer concrete, including all handling and mixing on site, cleaning and surface preparation, furnishing and placing primer, placing the PPC overlay material, finishing, all surface thickness adjustments including placing additional material and/or grinding, for grooving and removing all debris, and for all tools, equipment, labor, and all necessary incidentals involved in constructing the “Polyester Polymer Concrete Overlay”, complete in place, including furnishing, constructing, and disposing of test patch overlays in accordance with the Plans, as directed by the Engineer, as required by these Special Provisions, and in accordance with the System Provider’s instructions. The contract price bid shall also include the cost of having the polymer System Provider’s representative present as required in these Special Provisions.

8/17/2012

**603500 - REPLACING BAR REINFORCEMENT**

**Description:**

This work consists of furnishing and installing bar reinforcement during repair of structural concrete in accordance with notes and details on the Plans and as directed by the Engineer.

**Materials:**

Reinforcement bars shall be Grade 60 and meet the requirements of Section 603.02 of the Standard Specifications.

**Construction Methods:**

Reinforcement bars shall be installed in accordance with the specifications for the structural concrete repair, notes and details on the Plans and as directed by the Engineer.

**Method of Measurement:**

The quantity of bar reinforcement will be measured as the actual number of pounds (kilograms) of bar reinforcement placed and accepted for structural concrete repair. For the purpose of computing the theoretical weight of bar reinforcement the Table 603-A of Subsection 603.8 of the Standard Specifications will be used.

**Basis of Payment:**

The quantity of bar reinforcement will be paid for at the Contract unit price per pound (kilogram). Price and payment will constitute full compensation for furnishing and placing new bar reinforcement, and for all labor, equipment, tools and incidentals necessary to complete the work.

1/30/03

**605510 - PREFABRICATED EXPANSION JOINT SYSTEM, 2"**  
**605511 - PREFABRICATED EXPANSION JOINT SYSTEM, 3"**  
**605512 - PREFABRICATED EXPANSION JOINT SYSTEM, 4"**  
**605513 - PREFABRICATED EXPANSION JOINT SYSTEM, 5"**  
**605647 - PREFABRICATED EXPANSION JOINT SYSTEM, 1½"**  
**605730 - PREFABRICATED EXPANSION JOINT SYSTEM, 1"**

### **Description:**

This work consists of furnishing of all materials and necessary labor to fabricate, assemble, construct and install prefabricated strip seal expansion joint systems of the size(s) specified on the Plans, including extrusions, neoprene strip seal, angles, studs, and sliding plates on roadway and/or sidewalks in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

### **Materials:**

Steel members of the types, size and configurations shown on the plans shall conform to AASHTO M 270 Grade 36 (Grade 250) or Grade 50 (Grade 345), unless specified otherwise on the Plans. All steel of the joint system shall be painted with a three coat urethane paint system with a minimum total thickness of 9 mils (225 µm), and all screws shall be stainless steel ASTM A 276, Type 304.

The elastomeric material shall be 100% virgin Polychloroprene (Neoprene). The strip seal shall be an extruded neoprene material meeting the requirements of AASHTO M 220 modified to omit the recovery test. The elastomeric material shall have the following physical properties as determined by applicable ASTM tests:

<b>ASTM Standard</b>	<b>Physical Properties</b>	<b>Performance Requirements</b>
D 2240 (Modified)	Hardness, Type A durometer	60±7 points
D 412	Tensile Strength, minimum	2000 psi (13.8 MPa)
D 412	Elongation at break, minimum	250%
D 395 (Method B)	Compressive Set 70 hours at 212°F (100°C).	40%, maximum
D 573	Heat Resistance (over aging) 70 hours at 212°F (100°C)	
	Change in durometer hardness	0 to +10 points, maximum
	Change in tensile strength	-20%, maximum
	Change in ultimate elongation	-20%, maximum
D 1630	Abrasion Resistance	Index of 200 or greater Permissible
D 1149	Ozone Resistance 20 percent strain, 300 pphm in air, 70 hours at 140°F (60°C) (wiped with toluene to remove surface contamination)	No cracks
D 471	Oil Swell, ASTM Oil 3, 70 hours at 212°F (100°C), weight change	45%, maximum
D 2240	Low Temperature Stiffening maximum 7 days at 14°F (-10°C)	0 to +15 points, hardness Type A durometer

### **Construction Methods:**

Installation of the prefabricated expansion joint system, to include strip seal, steel extrusion, and application of adhesives, shall be in accordance with the manufacturer's written recommendations and instructions and as specified herein. Special tools for insertion of seals shall be provided by the manufacturer

as may be required. The Contractor shall make arrangements for a technical representative of the manufacturer to be available for advice and inspection during construction of strip seals to ensure satisfactory installation. The strip seal shall be furnished in one piece for the full length of the joint.

Welding shall conform to all applicable requirements of AASHTO/AWS D1.5, including qualifications of welders. Shop drawings and welding procedures must be submitted to the Engineer for approval prior to any fabrication. Welds at mitered joints in steel extrusions and between steel extrusions and plates and between studs and plates shall be tested by magnetic particle tests methods by a testing laboratory approved by the Department. All welds, fabrication and testing will be visually inspected by the Department or its approved representative. The Contractor shall submit the manufacturer's certification for quality of materials and the result of welding inspection to the Engineer. Mill test reports must be supplied for all steel. Where, in the opinion of the Engineer, welds are defective, they shall be re-welded or repaired in a manner acceptable to the Engineer.

The installation procedure as described herein, shall be adhered to unless modified by the Engineer.

The prefabricated sealing system shall be shop assembled as a unit including the neoprene strip seal, and preset prior to shipment, using prestressing bolts and adjustable temporary connections between positioning steel members. The opening of the joint shall be set at the width required for the seal at a temperature of 68°F (20°C).

The prefabricated joint assembly shall be positioned and attached to the structure by anchorages. Width adjustments shall be made at the discretion of the Engineer and manufacturer's representative. All movements due to shrinkage, creep, mid-slab deflections, and other factors shall be considered.

The prefabricated joint shall be set normal to the grade and the deck concrete slab graded to meet flush with the edge of the joint plates.

Before placing the deck slab, the anchorage attached to the abutment backwall, or adjacent steel or concrete stringers shall be released by loosening the bolts in the slotted anchorage connections. The prestressing bolts and adjustable temporary connections shall remain in place. After the deck slab has cured the width of joint shall be checked and again adjusted if necessary. The released anchorage shall be tightened, welded and the prestressing bolts and temporary connections removed. The backwall or deck on this side of the joint may then be poured after sealing the openings left by removal of prestressing bolts.

#### **Method of Measurement:**

The quantity of the specified size(s) of the prefabricated expansion joint system will be measured as the actual number of the linear feet (linear meters) furnished and installed, measured along the centerlines of the slab joints.

#### **Basis of Payment:**

The quantity of prefabricated expansion joint system will be paid for at the Contract price per linear foot (linear meter). Price and payment will constitute full compensation for fabricating, furnishing, and installing all materials, labor, equipment and all else necessary therefor and incidental thereto.

Payment for erection angles and other components not specifically part of the prefabricated strip seal joint system shall be included in Prefabricated Expansion Joint System.

8/17/2012



**605522 - URETHANE PAINT SYSTEM, EXISTING STEEL****Description:**

This work consists of recoating and/or overcoating the entire existing steel structure in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

All paint used on this structure shall be produced by a single manufacturer, and the coating system shall conform to the minimum requirements as noted below.

**Total Removal Primer**

Generic Type: Zinc-rich, single-component, moisture-cured polyurethane  
 Vehicle Type: Moisture-cured polyurethane  
 Volume of Solids: 60% Minimum  
 Pigment Type: 3.5 lbs/gal (0.42 kg/liter) Micaceous Iron Oxide/Zinc dust  
 Zinc/Micaceous Iron  
 Oxide Content in  
 Dry Film by Wt.: 83% Minimum  
 Coverage: 3 mils (75 µm) DFT minimum  
 VOC: Not to Exceed 2.8 lbs/gal (0.335 kg/liter)  
 Weight Per Liter: Minimum 22 lbs/gal (2.64 kg/liter)  
 Primer Performance: No rusting, blistering or scribe undercutting when tested by salt fog in accordance with SSPC Paint 20.

**Overcoat Primer or Intermediate Coat**

Generic Type: Micaceous iron oxide single-component, moisture-cured polyurethane.  
 Vehicle Type: Moisture-cured polyurethane  
 Volume Solids: 60% minimum  
 Solids by Wt: 82% ± 2.0% minimum  
 Pigment Type: 4.0 lbs/gal (0.48 kg/liter) micaceous iron oxide  
 Color: Tinted to distinguish from primer  
 Isocyanate: Formulate with a moisture cure polyisocyanate diphenylmethane diisocyanate based prepolymer with an isocyanate content of 16.0 to 17.0 weight percent, an NCO equivalent weight of 247 to 263, and a viscosity of 1400 ± 200 cps @ 77°F (25°C).  
 Isocyanate Content: 9.6 to 0.9 weight percent as determined by Kentucky method KM64-250.  
 Coverage: 3 mils (75 µm) DFT minimum  
 VOC: Not to exceed 2.8 lbs/gal (0.335 kg/liter)  
 Weight per liter: Minimum 16 lbs/gal (1.92 kg/liter)

**Topcoat:**

Generic Type: Two-component, aliphatic polyurethane  
 Vehicle Type: Acrylic aliphatic polyurethane  
 Resin: A hydroxyl bearing polyacrylic resin with a typical hydroxyl content of 4% and an average equivalent weight of 425 (both values at 100% resin solids). This resin will make up at least 95% of the polyol vehicle solids.  
 Curing Agent: A polyfunctional polyisocyanate resin based on Hexamethylene diisocyanate with an NCO content of 21.3 - 21.8% and an average NCO equivalent weight of 195.  
 Light Stabilizer: The base component (Component A) must contain 1% of a hindered amine light stabilizer. This is calculated from the resin solids of component A and Component B.  
 Initial Gloss: 80%(minimum) @ 60° per ASTM D 523  
 Solids Content: Total solids of the mixed product will be 75.0 ± 2.0 percent by weight as determined by ASTM D 2369 using a 4 hour air dry time plus 1 hour oven dry at 110°F (43.3°C).

Pot Life:	3 hours minimum at 77°F (25°C) and 50% relative humidity
Color:	As specified in the Plans
Coverage:	3 mils (75 µm) DFT minimum
VOC:	Not to exceed 2.8 lbs/gal (0.335 kg/liter)

All M.I.O. (Micaceous Iron Oxide) filled products must conform to ASTM D 5532, Type I and have a certification of conformance from the Raw Materials Manufacturer. Each single coat of paint shall be a color different from the others. The color of the primer and intermediate coat shall be at the Contractor's option, and shall provide contrast with the underlying substrate or previously applied paint. The color of the finish paint shall be as specified in the Plans.

A moisture-cured polyurethane topcoat will be acceptable provided the manufacturer submits data showing a 70% minimum gloss after 24 months exposure in southern Florida on panels facing due south at 45° from the horizon on a color the same or similar to the ones in the Plans.

The coatings manufacturer shall supply, in writing, the minimum and maximum recoat times of the primer and intermediate coat. If the Contractor fails to complete the painting during these established time periods, the surface area shall be cleaned at the Contractor's expense if necessary as determined by the Engineer.

**Basis of Acceptance** - All components of the system (primer, intermediate and finish coats) will be accepted on the basis of the manufacturer's written certification that the batch(s) produced meets their product specification and this Item. In addition, the Contractor shall submit a 1 quart (liter) sample of each component of the system (primer, intermediate and finish coats) to the DelDOT Materials and Research Section (call (302) 760-2401 for details) 30 days prior to the start of painting. The samples submitted shall be from paint to be used on the bridge with the same batch numbers and shall be labeled with the manufacturer's name, product name, component part, batch number, date of manufacture, and the bridge on which it is to be used. The Department will perform testing on the paint submitted. The Department reserves the right to take random samples of the paint at anytime during the construction and application.

Only paint arriving on the site in new, unopened containers shall be used.

Containers of paint shall be labeled with the manufacturer's name, product name, component part, batch number, date of manufacture, and shelf life date. Paint in containers having expired shelf life dates shall be immediately removed from the work site.

### **Construction Methods:**

All structural steel members, railings, fascia, downspouts and other miscellaneous steel items that have previously been painted shall be cleaned and painted.

**Surface Preparation** - Surfaces to be cleaned shall be identified in the following manner:

Blast clean surfaces for total removal in accordance with Item 605532 – Cleaning Existing Steel Structures (non-hazardous base). Pressure wash surfaces for overcoating in accordance with item 605622.

Where power tool cleaning is specified, the perimeter or edge of intact paint adjoining the cleaned surface shall be feathered back and the adjoining paint shall be tightly adhered. Ragged edges on intact paint will not be allowed. Adherence will only be considered satisfactory if the adjoining remaining paint is smoothly feathered back and cannot be removed by lifting with a dull putty knife. After power tool cleaning operations are completed, all residue generated by the cleaning work shall be removed by vacuuming.

Blast cleaned surfaces shall be accepted by visual comparison to a project prepared standard. The Contractor shall prepare the project standard by cleaning a representative area on the structure that is being prepared for painting. The prepared standard shall generally conform to SSPC-Vis 1-89, "Visual Standard for Blast Cleaned Surface," Pictorial Standards A SP10, B SP10, C, SP10, and D SP10, as applicable, and shall be approved by the Engineer before the start of general cleaning work. More than one standard may be necessary if the cleaned steel differs significantly from the photographic standards due to the surface conditions or other factors. There shall be one standard per span of the bridge. Each standard shall be at least 1' x 1' (300 mm x 300 mm) in size, and shall be located in an area of the span that is accessible to, and approved by the Engineer.

The Contractor shall protect the project standards from corrosion and contamination throughout the duration of the work. Protection shall be by applying a clear coat of polyurethane or by other means. At the completion of the cleaning work, the project standard shall be re-cleaned and painted in accordance with the specification. If, in the opinion of the Engineer, the project standard becomes deteriorated or otherwise ineffective, it shall be re-established in accordance with this specification at no additional cost to the Department.

**Painting -**

**Manufacturer's Instructions** - At least five (5) working days prior to the start of work, the Contractor shall provide the Engineer with one copy of the paint manufacturer's current Technical Data and Materials Safety Data Sheets for the paint materials being furnished. Instructions, suggestions and precautions contained in these data sheets shall be followed to the extent that they do not contradict the provisions of this specification.

**Specifications and Inspection Equipment** - Prior to the start of and throughout the duration of work, the Contractor shall be required to supply the Engineer with the following:

One bound copy each of the SSPC surface preparation specifications SSPC-SP1, Solvent Cleaning, SSPC-SP11, Power Tool Cleaning to bare metal, and SSPC-SP10, Near-White Metal Blast Cleaning.

One bound copy of SSPC pictorial standard SSPC-Vis1-89, Visual Standard for Blast Cleaned Surfaces, SSPC-Vis3, Visual Standard for Power and Hand Tool Cleaning.

One bound copy of SSPC Paint Application Standard No. 2 (SSPC-PA2), Measurement of Dry Film Thickness with Magnetic Gages.

One Bachrach Sling Psychrometer (Includes air thermometer)

One set of US Weather Bureau Tables

Three (3) Surface Thermometers, 0-150°F (-18 to 66°C)

One Positector 6000 Electronic Dry Film Thickness Gage.

One spring micrometer and one roll per span of Testex X-Coarse Replica Tape

Atmospheric Conditions - Painting shall not be performed unless the following conditions are met:

The receiving surface is clean and free of "rustback" and free of condensation and visible moisture; and

The receiving surface and ambient air temperature shall be as recommended by the paint manufacturer, except that in no case shall the painting work be performed when the surface and ambient temperatures are less than 35°F (2°C) or greater than 100°F (38°C).

All surfaces shall meet the manufacturer's dew point requirements when painting is performed. For moisture-cured urethanes, a surface will be considered too wet to paint if a moist handprint is visible after the surface is touched.

No painting is to occur in the winter months between the dates of December 15 and March 15.

Mixing Paint - All paints shall be thoroughly mixed with mechanical mixers in accordance with the manufacturer's recommendations.

Solvent Restrictions - Thin only with approved manufacturer's thinner. Thinning is allowed only in strict accordance the manufacturer's recommendations and state VOC regulations. Unauthorized use of solvents shall result in re-cleaning and repainting the surface in accordance with this specification, at the Contractor's expense.

Paint Application - Paint coatings may be applied using brush, roller or spray methods, except the primer which shall be applied by spray methods.

Stripe coating with primer will be required on the following surfaces cleaned to bare metal. All welds, rivets, bolts, nuts, and edges of plates, angles, lattice, pieces or other shapes, and corners and crevices shall be "striped" with primer before the general primer coat is applied. All stripe painting will be performed using brush only. No other method will be allowed for stripe painting.

Complete protection against paint spatter, spillage, overspray, wind-blown paint, or similar releases of paint shall be provided. Covers, tarps, mesh and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine and other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

Number of Coats - Steel shall be painted with one coat of Primer, one coat of Intermediate coat, and one coat of topcoat.

Film Thickness - Paint shall be applied in sufficient quantity to produce the minimum dry film thickness specified under Material.

Painting Schedule - Primer shall be applied on the same day of the cleaning operation and before rusting occurs to the cleaned surface. Failure to apply primer to a cleaned surface within 8 hours shall result in re-cleaning the surface in accordance with this specification at no additional cost to the Department.

The intermediate paint shall be applied to the receiving surface within 14 days of the application of the primer, or within the manufacturer's recommended maximum recoat time, whichever is less.

The finish paint shall be applied to the receiving surface within 14 days of the application of the previous coat (intermediate), or within the manufacturer's recommended maximum recoat time for the intermediate coat, whichever is less. The finish paint color on all the fascia beams for the bridge shall be painted with paint from the same batch number and date of manufacture in order to avoid uneven paint color. If more than one batch of paint is needed to paint the fascias, then a natural break point such as the end of a span shall be used to change batch numbers.

Areas failing to meet the specified minimum dry film thickness shall be recoated with the same type of paint to produce at least the total dry film thickness required. Paint applied containing thinners, paint applied to contaminated surfaces, and paint applied contrary to this specification shall result in re-cleaning and repainting the surface. The work of re-cleaning and repainting, if required, shall be done by the Contractor to the satisfaction of the Engineer at no additional cost to the Department.

If a coat of anti-corrosive grease is applied to an area on the bridge (such as the bearings) then the grease shall be sprayed with the finish coat of the bridge paint being used provided that the bearing for the other areas that are designated to receive the grease have already been cleaned and painted.

Materials Storage - Paint in storage shall be protected from damage and maintained between 40°F (4°C) and 85°F (29°C), unless the coatings manufacturer requirements are more stringent. Paint not used before the expiration date shall be immediately removed from the project site.

### **Painting of Galvanized Steel -**

All galvanized steel surfaces shall be painted with a moisture-cured aluminum paint that is designed to adhere to galvanized steel surfaces. The moisture-cured aluminum paint must meet the following requirements:

#### One-Coat System

Generic Type:	Aluminum-filled aromatic moisture-cure urethane
Vehicle Type:	Moisture-cured aromatic polyurethane
Pigment Type:	Minimum 2 lbs/gal (0.240 kg/liter) non-leaving aluminum
Coverage:	2 mils (50 µm) DFT, minimum
VOC:	Not to exceed 3.5 lbs/gal (0.42 kg/liter)
Weight per gallon:	9.2 lbs/gal (1.10 kg/liter)
Solids by volume:	52.0 ± 1.0%
Shelf life:	6 months minimum from date of shipment

**Stenciling Requirement** - At the completion of the painting work, the completion date (month and year) and the bridge number, shall be stenciled on the structure in 3" (75 mm) numbers. The paint used for this

stenciling shall be the same as the topcoat except the color shall be black. The numbers shall be stenciled on the outside of each fascia beam at the approaching traffic ends of the structure, at a location designated by the Engineer.

**Method of Measurement:**

The quantity of painting will not be measured.

**Basis of Payment:**

The quantity of painting will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing all materials, equipment necessary to complete the work, cost of providing protection against damage during paint application, for all labor, tools and necessary incidentals to complete the job.

Progress payments will be made based on percentage of the structure cleaned and painted in accordance with this specification.

8/17/2012

**605532 - CLEANING EXISTING STEEL STRUCTURES (NON-HAZARDOUS BASE)**

**Description:**

This work consists of complete blast cleaning of metal surfaces of the existing steel structures, as specified on the Plans including downspouts, utility pipes and support system and all brackets, etc. Hand railings and chain link fence enclosures, shall be excluded from this item, unless otherwise specified on the Plans. (When the entire deck is to be removed according to the Plans, then the top and sides of all the top flanges shall also be blast cleaned according to this specification.)

**Construction Methods:**

All areas shall be blast cleaned to a near-white finish as defined in SSPC-SP10 for which reference should be made to SSPC Visual Standards (VIS1-89). Areas of oil and grease on surfaces to be coated shall be cleaned with clean petroleum solvents prior to blast cleaning. When applicable, prior to blast cleaning a beam, the top of the bottom flange shall be scraped to remove the accumulated dirt.

All fins, tears, slivers and burred or sharp edges that are present on any steel member, or that appear during the blasting operations, shall be removed by grinding and the area reblasted to give a 1 to 2.5 mils (25 to 63  $\mu$ m) surface profile. Scaling hammers may be used to remove heavy scale, but heavier type chipping hammers which would excessively scar the metal shall not be used.

Abrasive used for blast cleaning, shall be an approved low dusting abrasive and shall have a gradation such that the abrasive will produce a uniform profile of 1 to 2.5 mils (25 to 63  $\mu$ m) as measured with Textex Replica Tape. Unless otherwise noted on the Plans, a list of recommended low dusting abrasive for use in this job is specified at the end of this specification.

All abrasive and paint residue shall be removed from steel surfaces with a good commercial grade vacuum cleaner equipped with a brush-type cleaning tool, or by double blowing. If the double blowing method is used, the exposed top surfaces of all structural steel, including flanges, longitudinal stiffeners, splice plates, hangers, etc., shall be vacuumed after the double blowing operations are completed. The air line used for blowing the steel clean shall have an inline water trap and the air shall be free of oil and water as it leaves the air line. The steel shall then be kept dust free, and primed within 8 hours after blast cleaning.

**Protection of the Structures** - Care shall be taken to protect freshly coated surfaces, bridge bearing components, hand railings, galvanized fence enclosures, all appurtenances and any adjacent concrete from blast cleaning operations. These areas shall be protected from blast cleaning operations by shielding or masking. Blast damaged primed surface areas shall be thoroughly wire brushed, and if visible rust occurs, be reblasted to a near-white condition. The wire brushed or blast cleaned surfaces shall be vacuumed and reprimed.

**Provisions for Field Inspection** - The Contractor shall furnish and erect scaffolding, meeting the approval of the Engineer, to permit inspection of the steel prior to, and after the coating operation.

Rubber rollers or other protective devices meeting the approval of the Engineer, shall be used on scaffold fastenings. Metal rollers, or clamps, and other type fastenings which will mar or damage freshly coated surfaces, shall not be used.

**Protection of the Public** - Pedestrian, vehicular and other traffic upon or underneath the structure shall be protected in accordance with the applicable requirements of Section 107 of the Delaware Standard Specifications. The Contractor shall be responsible and compensate for any damage caused by his operations to vehicles, persons, and property.

During blast cleaning operations, the Contractor shall make provisions for protecting existing traffic from any hazards resulting from the blast cleaning operations. These provisions shall include a type of barrier system, which would protect vehicles and pedestrians from direct blasting and eliminate abrasive materials and debris from falling into water beneath or on the pavement or into an area which would create a traffic hazard.

All abrasive material with paint scales and debris deposited on the pavement, shoulders, slope paving, and in the working areas shall be removed before those areas are reopened to traffic. The waste materials shall be carefully disposed of away from the work site.

**Method of Measurement:**

The quantity of existing steel structures cleaned will not be measured.

**Basis of Payment:**

The quantity of existing steel structures cleaned will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing all materials, scaffolding and any other device used for cleaning work, cleaning, collecting and disposing of all waste materials, preparing the surface, for all labor, equipment, tools and all other incidentals necessary to complete the item.

3/14/02

**RECOMMENDED LOW DUSTING ABRASIVES**

1. STARBLAST - DuPont - Wilmington, Delaware 19898
2. GREEN DIAMOND - Grade 2050 or 3060 - Reed Minerals Division - Highland, Indiana 46322
3. #40 POLY-GRIT, M.D.C. Industries, Inc. - Philadelphia, PA, 19134 - Tel. 215-426-5925

**605578 - REPLACING STEEL RIVETS/BOLTS**

**Description:**

This item shall consist of furnishing all materials and replacing rusted/deteriorated rivets and/or bolts of structural members with new high strength bolts in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials and Construction Methods:**

Bolts shall be high strength friction type bolts, nuts, and washers conforming to the requirements of AASHTO M 164 (ASTM A 325), Type 3. All nuts and washers shall be AASHTO M 291 (ASTM A 563) and AASHTO M 293 (ASTM F 436), respectively.

The Plans provide guidelines for the determination of when rivets/bolts shall be replaced with new high strength bolts. Where a group of rivets/bolts is being replaced, one rivet at a time shall be removed and immediately replaced with a new high strength bolt before the next rivet/bolt is removed.

Existing loose bolts shall not be re-tightened. Loose and defective bolts shall be removed and replaced.

**Method of Measurement:**

The replacing of steel rivets/bolts to be paid for under this item shall be per each location where steel rivets/bolts are installed/replaced.

**Basis of Payment:**

The payment for the item shall be made for at the contract unit price bid per each for Replacing Steel Rivets/Bolts, which price and payment shall constitute full compensation for furnishing all materials, removing the defective rivets/bolts as directed and replacing with new high strength steel bolts, disposing of discarded materials, for all labor, equipment, tools, and incidentals necessary to complete the work.

6/21/2012



## **605584 - STEEL STRUCTURE REPAIR**

### **Description:**

This work consists of furnishing all materials necessary to repair or replace deteriorated and/or damaged steel members including floorbeams, stringers, lateral struts, sway bracing, wind bracing, gusset plates, wind link, wind link bearing, catwalk members, drain support angles, etc. in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

### **Materials:**

All replacement materials shall conform to the requirements of AASHTO M 270 (ASTM A 709) Grade 50W. Existing rivets replaced with high strength bolts shall meet the requirements of AASHTO M 164 (ASTM A 325) Type 3, unless otherwise directed in the Plans. Reference the Special Provisions for Item 605578 – “Replacing Steel Rivets/Bolts” for additional requirements. Where directed on the plans AASHTO M 253 (ASTM A 490) Type 3 high strength bolts shall be used. All nuts and washers shall be AASHTO M 291 (ASTM A 563) and AASHTO M 293 (ASTM F 436), respectively. In addition, all temporary bolts required to aid in the facilitation and implementation of the repairs shall meet the requirements of AASHTO M 164 (ASTM A 325) with a hardened washer under both the head and the nut.

Metal reinforced epoxy filler and silicone caulking material shall meet the requirements shown on the Plans.

### **Construction Methods:**

Fabrication and painting of replacement structural members including plates and angles shall be in conformance with applicable provisions of Section 605 of the Standard Specifications. The Contractor may only replace one (1) structural member (i.e., lateral strut, sway brace, wind brace, gusset plate, etc.) at a time. Unless otherwise stipulated on the Plans, the replacement of sway and wind bracing and stringer cover plates may not be performed with the bridge open to traffic, including construction traffic. The Contractor shall limit the material and equipment on the structure to that necessary for completion of repairs and at no time shall the Contractor store any materials or construction equipment on the structure. The bridge shall be temporarily braced for the purposes of replacing the deteriorated wind link bearing assemblies at panel point L26 (reference the Special Provisions for Item 605606 – Temporary Bridge Support System for additional information). All structural member connection plates or gusset plate replacements shall be done while removing one rivet/bolt at a time and immediately installing in the hole a temporary AASHTO M 164 (ASTM A 325) bolt, before the next rivet/bolt is removed. All rivets/bolts shall be removed and replaced with temporary bolts before initiating member replacement to minimize the amount of time required for replacement of the members. A structural member replacement shall be removed and replaced in the same work shift. At no time shall a member that is being replaced be removed and left overnight without installing a temporary support system approved by the Engineer.

Temporary supports required to complete the work shall be incidental to the item. The Contractor shall prepare working drawings and computations for all temporary support systems to be utilized and submit them to the Engineer for review and approval. Temporary support systems shall be designed in accordance with the latest edition of the AASHTO Standard Specifications for Highway Bridges (including all interims) and stamped and signed by a Professional Engineer licensed in the State of Delaware. Approval of these working drawing submittals will not relieve the Contractor from his responsibility for any damage caused as a result of his work and/or temporary support system.

Any damage to the existing structure to remain as a result of the Contractor’s operations shall be repaired by the Contractor to the satisfaction of the Engineer and the Department at no additional cost to the Department.

All shop drawings submitted for approval shall include the weight for each individual item and total weight (including bolts) to be delivered to the job site for installation. Bolt lengths, quantities, and weights shall be included with all submissions.

### **Method of Measurement:**

The quantity of steel structure repair will be measured per pound in accordance with the provisions of Subsection 605.40 of the Standard Specifications.

**Basis of Payment:**

The quantity of steel structure repair will be paid for at the Contract unit price per pound. Price and payment will constitute full compensation for furnishing and placing all replacement structural steel including bolts, the removal of associated existing rivets, proper disposal of removed structural steel, reaming and field dressing existing connection holes to accept new bolts, layout and drilling of new holes as required to install new steel in accordance with the Plans, cleaning and painting adjacent steel member areas affected by this work, all metal reinforced epoxy filler and silicone caulking material, submitting working drawings for all replacement material or any temporary support system, repairing any damage incurred to the existing structure to remain, and for all labor, tools, equipment and any incidentals necessary to complete the work in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

8/17/2012

**605606 - TEMPORARY BRIDGE SUPPORT SYSTEM**

**Description:**

This work consists of supplying, installing and removing a temporary structural support system for the purpose of supporting the bridge during replacement of the existing wind link bearing assembly at panel point L26 in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

All materials used in the temporary structural support system shall meet the following minimum requirements:

Structural Steel	ASTM A 709 Grade 50 or 50W
High Strength Bolts	AASHTO M 164 (ASTM A 325) Type 1 or 3
Hex Nuts	AASHTO M 291 (ASTM A 563) Grade A
Washers	AASHTO M 293 (ASTM F 436)
Welding	AASHTO/AWS D1.5

All materials necessary to implement the temporary support system, including steel, bolts, nuts, washers and welding, are included in the cost of the item and shall be provided in accordance with the latest edition of the AASHTO Standard Specifications for Highway Bridges (including all interim revisions).

**Construction Methods:**

The temporary bridge support system shall be installed as shown on the Plans. The Contractor is hereby notified that no structural components shall be welded to any portion of the existing structure. Bolting to the existing structure will be allowed, however, details of methods to be used for any proposed field bolting to existing steel shall be submitted for review and approval by the Engineer.

As an alternate to the temporary bracing specified in the Plans, the Contractor may propose the use of an alternate bracing system. The use of any alternate system must be approved by the Engineer. The Contractor shall submit working drawings and computations demonstrating that this alternate bracing system can safely resist the required minimum loads in accordance with the latest edition of the AASHTO Standard Specifications for Highway Bridges (including all interim revisions). The calculations shall be prepared, stamped and signed by a Professional Engineer licensed in the State of Delaware.

**Method of Measurement:**

The quantity of temporary bridge support system will not be measured.

**Basis of Payment:**

The quantity of temporary bridge support system will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing, installing, and removing all materials necessary to provide temporary lateral support at the wind link bearing at panel point L26 while repair operations are ongoing including supplying, installing, adjusting, removing the support system, preparing and submitting working drawings of the support system, repairing any damage incurred to the existing structure to remain, and for all labor, tools, equipment and any incidentals necessary to complete the work as required on the Plans, these Special Provisions, and as stipulated by the Engineer.

6/21/2012

## **605670 - BRIDGE JOINT DRAIN TROUGH**

### **Description:**

This work shall consist of furnishing all materials, assembling, and installing a rubberized drainage trough with stainless steel hardware beneath the existing finger joint and strip seal expansion joints on the bridge in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

### **Materials:**

Stainless Steel Plate - ASTM A 666  
 Stainless Steel Bolts and Studs - ASTM F 593  
 Stainless Steel Washers and Locknuts - ASTM F 594  
 Rubberized Trough Material - Furnish either Chloroprene or Butadiene Acrylonitrile meeting the following requirements:

Minimum Hardness - Type A, ASTM D 2240	50 Durometer
Maximum Hardness - Type A, ASTM D 2240	60 Durometer
Minimum Tensile Strength, psi (kPa), ASTM D 412	1400 (9650)
Minimum Elongation at Break, %, ASTM D 412	300
Oven Aging, 70 hours at 212 degrees F (100 degrees C)	
Maximum Elongation, % loss	-18
Maximum Tensile Strength, % loss	-35
Maximum Hardness, Points Change	+10
Brittleness to Heat Aging, ASTM D 573	-34 degrees C
Tear Resistance, lb/ft (kg/m)	
Die C., ASTM D 624	1441 (2143)
Resistance to Ozone Aging, ASTM D 1149	No cracks for 100 hours of exposure of 20% elongated samples at 100 degrees F and 100 pphm ozone
Oil Swell, 70 hours at 212 degrees F (100 degrees C) using ASTM Oil3.	
Weight Change, % Maximum, ASTM D 471	45

### **Construction Methods:**

Construct the drain trough assemblies in accordance with the details shown on the Plans and as directed by the Engineer. The Contractor shall verify in the field all dimensions and cross slopes for the drain trough assembly and submit shop drawings for approval prior to fabrication of any material. The continuous steel members of the trough assembly may be spliced, as required, to facilitate handling and construction. The shop drawings must reflect location of splices and welding procedures. The rubberized drain trough may not be spliced and must be installed in one continuous piece for each slope. At the drain trough catch basins, provide a 6" (150 mm) gap between the rubber troughs as an opening for drainage into the downspout.

Pre-assemble the drainage trough assembly and disassemble prior to shipping to guarantee proper fit for all members. Use slotted holes in the stainless steel plates if necessary to allow for field adjustments. Stainless steel mounting plates may be spliced as approved by the Engineer.

### **Method of Measurement:**

The quantity of bridge joint drain trough will not be measured.

### **Basis of Payment:**

The quantity of bridge joint drainage trough will be paid for at the Contract lump sum price. Price and payment shall constitute full compensation for furnishing and installing all materials as described in this specification, preparing working drawings, preassembling the troughs, for all hardware required for installing

the drain troughs, removal and disposal of excess material, and for all labor, tools, equipment, and incidentals necessary to complete the work.

6/21/12

## **605690 - COATING WARRANTY**

### **Description:**

There shall be a special project warranty guaranteeing the performance of the complete coating systems, including surface preparation, materials, and application against failure for a **period of two (2) years from the date of final acceptance.**

The Project Warranty and Guarantee to be submitted shall be signed and attested to by two (2) corporate officers of the Prime Contractor. The Prime Contractor, regardless of which Contractor applies the paint system, will ultimately be responsible for the Warranty and Guarantee. The Contractor shall supply, prior to the start of painting, the name, address, and phone number of the designated contact person for all issues involving the Project Warranty. Joint warranties or guarantees between Contractor/Sub-Contractor or Contractor/Coatings Manufacturer will not be accepted.

**Warranty Bond Requirements:** The Contractor shall submit to the Department a warranty bond at the final acceptance of project to insure the State of Delaware of performance during the two (2) year Project Warranty and Guarantee period. The warranty bond shall be an amount equal to one hundred percent (100%) of the total Contract quantity paid at the unit prices specified in the bid proposal for all items related to preparation, cleaning, bridge painting, and maintenance of traffic to perform 2 year required warranty work. The amount of the warranty bond does not relieve the Contractor of his/her responsibility to repair all required areas within the warranty period. The bond shall be retained for two (2) years from that date and after a joint meeting between the Engineer and the Contractor to determine ultimate acceptance.

**Warranty Evaluation Review:** The State of Delaware shall notify the Contractor in writing of any failure of the coating system discovered within the warranty period. This notice shall be in writing and sent by registered mail, or other special delivery service, cost prepaid, return receipt requested, to the Contractor. All such notices when deposited in the mail, or shipped, shall be considered served when deposited.

The Contractor shall respond within 30 days of said notice to acknowledge receipt and to submit a plan of action to complete the repairs.

The Contractor will be given full and complete opportunity, not interfering with the State of Delaware activities, to inspect and test the alleged failure and coatings.

During the month before the end of the warranty period, the Engineer will inspect the bridge thoroughly for failures of the coating system. This semifinal warranty inspection will be performed jointly by the Department and the Contractor with equipment supplied by the Contractor at his/her expense. The inspection equipment shall be OSHA approved, vehicle mounted, and provide access to all areas of the structure. Traffic control and required signing shall be the Contractor's responsibility and at the Contractor's expense during the semifinal warranty inspection. The Contractor's traffic control plan shall be in accordance with the DelDOT traffic control manual and shall be submitted to the Department for approval.

### **Failure of the Coating System Definition**

- 1) Active Corrosion of the substrate equivalent to ASTM D610 or SSPC-VIS 2, rust grade 7(0.3% of the surface) or worse; loss of adhesion from the substrate.
- 2) Cracking, checking, mudcracking, alligatoring, finning, wrinkling, sagging, flaking, intercoat delaminations, running, or peeling determined visually by the Engineer and verified by destruction of coating in disputed areas.
- 3) Sub-film corrosion determined visually by the Engineer and verified by destruction of coating in disputed areas.
- 4) Loss of adhesion greater than or equal to a rating of 2A in ASTM D3359-95a (Standard test Methods for Measuring Adhesion by Tape Test) test method A-X-Cut tape test.
- 5) Erosion of the film at a rate of two (2%) percent of the coating surface of any contiguous area as defined below per year or greater determined by Engineer measuring actual areas of failures.

- 6) Non-uniformity of topcoat color such as patches, streaks, chalking, or patterns discernable from a distance of ten feet (three meters) or greater that cannot be eliminated by washing.

Failure of the coating system shall be considered to have occurred if the sum of the failures described above is greater than two (2) percent of the coating surface of any single contiguous area as defined below. The SSPC "Guide to Vis-2" shall be used as a guide in determining failure.

A contiguous area is defined as:

- 1) Each face (including top flange and top of bottom flange) of each stringer beam in each span; or
- 2) Each bottom of the lower flange in each span; or
- 3) Each diaphragm; or
- 4) Each bearing

**Warranty Repair Requirements:** The Contractor shall, within 120 days after receipt of written notice, correct any failures in materials and workmanship which develop within the guarantee period. Variations to the 120 day requirement may be granted if the Contractor is impeded by permits, traffic control, weather, construction, or any other State projects not under the Contractor's control. Extensions will be granted as per the Engineer's recommendations. The Contractor must also correct and/or repair any damage to other work or property of the State of Delaware caused by defective materials, equipment or workmanship when performing said warranty repairs. The Engineer will determine the degree of the repair or corrective procedure.

In the event the Engineer determines that there is a coating failure, the Contractor will be obligated under this Warranty and Guarantee to provide labor, materials, and equipment at his/her own expense to repair and/or replace the coating system to the performance requirements of the original Contract. The extent of repair and/or replacement will be determined in a cooperative effort by the Contractor and the Engineer. Maintenance of traffic and access to the failure areas, including railroad permits and coordination, shall be at the Contractor's expense. Overcoated and recoated areas are to overlap a properly performing adjacent coating system. Any fascia girders/beams or areas visible to the public will receive a cosmetic topcoat to promote a uniform color and appearance of the painted structure. This will only occur if a failure or repair create a discontinuity of the visible appearance as determined by the Engineer.

**Exclusions to the Warranty and Guarantee:**

Excluded from the Warranty and Guarantee are any and all damages that occur after acceptance of the coating system by the Engineer that are not a direct result of normal usage (i.e. collisions, fires, structural failure, acts of God etc.). Exclusions also include any areas agreed to in writing by both the Contractor's representative and the Engineer before the initiation of the project.

The foregoing guarantee and obligations shall not deprive the State of Delaware of any action, right or remedy otherwise available for breach of any of the provisions of the Contract documents. The periods referred to above shall not be construed as a limitation on the time in which the State of Delaware may pursue such other actions, right or remedy.

**Method of Measurement & Basis of Payment:**

Coating warranty will not be measured. There will be no separate payment for coating warranty. All cost for providing the coating warranty will be considered as incidental to the coating (painting) item(s) on the Contract.

3/14/02

**605693 - SILICONE JOINT SEAL, 1"**  
**605694 - SILICONE JOINT SEAL, 2"**  
**605695 - SILICONE JOINT SEAL, 3"**

**Description:**

This work consists of removal and disposal of existing joint materials and furnishing and installing all new joint materials in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

When specified, a polymer concrete nosing compatible with the silicone sealant as required by the sealant manufacturer shall be installed. The minimum dimensions for a polymer concrete nosing cross section are 1½" (40 mm) deep by 3½" (90 mm) wide. The polymer concrete shall be furnished and installed in accordance with item 602602 – Polymer Concrete.

**Materials:**

**Silicone Joint Sealer:**

The material for the two component silicone sealer shall be DOW CORNING 902 RCS JOINT SEALANT as manufactured by Dow Corning Corporation, P.O. Box 994, Midland, MI 48686-0994 [Telephone (989) 496-4400], ROYSTON FLEX-FLO as manufactured by Chase Corporation, 295 University Avenue, Westwood, MA 02090 [Telephone (781) 332-0764], WABO SILICONE SEAL as manufactured by Watson Bowman Acme Corporation, 95 Pineview Drive, Amherst, NY 14228 [Telephone (716) 691-7566 or 1-800-677-4922], or approved equal.

The silicone joint sealer shall cure in less than one (1) week, and shall accommodate typical bridge movement and traffic within eight (8) hours. The 100% silicone sealant shall be self-leveling, cold applied, rapid curing, and two component. The sealant, upon curing, shall demonstrate resilience, flexibility and resistance to moisture and puncture. The sealant shall also demonstrate excellent adhesion to Portland cement concrete, polymer concrete and steel over a range of temperatures from -30 to 130 degrees F (-34 to 54 degrees C) while maintaining a watertight seal. The sealant shall not contain any solvents or diluents that cause shrinkage or expansion during curing. In addition, acid cure sealants will not be permitted.

The date of manufacture shall be provided with each lot. Materials 360 days or older from the date of manufacture will not be accepted. The manufacturer shall certify that the sealant meets or exceeds the following test requirements before installation begins. The Department reserves the right to test representative samples from material proposed for use.

**Physical Properties:**

**Each component as supplied:**

Flow (ASTM C 639 Type I)	Self Leveling
Specific Gravity (ASTM D 792 Method A)	1.2 to 1.4
Extrusion Rate (ASTM C 1183)	200 to 600 grams per minute
Durometer Hardness, "00" (ASTM C 661) (32 degrees F and 77±3 degrees F) (0 degrees C and 25±1 degrees C)	40 to 80
Accelerated Weathering (ASTM C 793)	No chalking, cracking or bond loss after 5000 hours

**After Mixing:**

Tack Free Time (ASTM C 679)	60 minutes maximum
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Upon Complete Cure: (ASTM D 5329)

Joint Elongation (tensile Adhesion) 600% minimum

Joint Modulus 3 to 15 psi (21 to 103 kPa) at 100% elongation

**Backer Rod:**

The backer rod used to maintain sealant depth shall be extruded expanded closed cell low density polyethylene foam conforming to ASTM D 5249, Type 3. Backer rod shall have a skin-like outer texture that will not bond to the silicone sealant. Paper rope, open cell foam rod or other back-up materials will not be acceptable. The backer rod shall be sized according to the manufacturer's recommendations for the size of the joint to be sealed as measured by the Contractor.

**Primer:**

The primer for silicone sealant shall be in accordance with the silicone manufacturer's recommendations.

**Construction Methods:**

**General:**

The Contractor shall furnish the Engineer with the manufacturer's product information and installation procedures at least two (2) weeks prior to installation.

When placing the silicone against concrete, the concrete surface shall be dry. For newly placed concrete, the concrete shall be fully cured and allowed to dry out a minimum of seven additional days prior to placement of the silicone. Cold, wet, inclement weather will require an extended drying time.

**Surface Preparation:**

Sandblasting: After the removal and disposal of the existing joint materials is completed, the joint shall be sandblasted clean to remove all traces of contaminants from each joint face. A separate pass for each face for the full length of the joint and to a minimum of the design depth of the center of the backer rod will be required. The nozzle shall be held at an angle of 30 to 90 degrees to the joint face, at a distance of one to two inches (25 to 50 mm).

For portland cement concrete and polymer concrete surfaces, sandblasting will be considered acceptable when both joint faces have a roughened surface with clean, exposed aggregate. The surface shall be free of foreign matter or plastic residue.

For steel surfaces, the full angle leg shall be cleaned by sandblasting and will be considered acceptable when the steel surfaces have been cleaned to an SSPC-SP10 degree of cleanliness.

After sandblasting is complete, the joint shall be cleaned of debris using compressed air with a minimum pressure of 90 psi (620 kPa). The air compressor shall be equipped with traps to prevent the inclusion of water and/or oil in the air line.

Priming: Priming shall be according to the manufacturer's instructions. This operation will immediately follow sandblasting and cleaning, and will only be permitted to proceed when the air and substrate temperatures are at least 41 degrees F (5 degrees C) and rising and the joint surfaces are thoroughly dry and clean. Sandblasting, priming and sealing shall be performed on the same day (within the same work shift). Surfaces to be primed shall be primed using a brush applied primer. For steel surfaces, when specified per the manufacturer's instructions, the primer shall be allowed to cure before proceeding. The minimum cure time shall be extended according to the manufacturer's recommendations when the substrate temperature is below 60 degrees F (15 degrees C).

The primer shall be supplied in the original containers and shall have a "use-by" date clearly marked on them by the manufacturer. Only primer, freshly poured from the original container into clean pails will be

permitted. The primer shall be used immediately. All primer left in the pail after priming shall be disposed of and shall not be reused.

**Joint Installation:**

Backer Rod Placement: The backer rod shall be sized in accordance with the silicone sealant manufacturer's recommendations (minimum 25% oversized). The backer rod shall be installed to a uniform depth in accordance with the Plans and as recommended by the manufacturer. The backer rod may be installed by hand, but a roller device shall be used to insure a consistent, uniform placement at the proper depth below the riding surface. All splices in the backer rod shall be taped to prevent material loss during sealing. The backer rod shall be installed to within 1/8" (3 mm) tolerance prior to sealing.

Sealant Placement: The installation of the silicone sealant is to be done as soon after cleaning and backer rod placement as reasonably possible to insure the joints are still clean and dry. In the event the joint does become contaminated, damp, or wet, the backer rod shall be removed, the joint cleaned and dried, and a new backer rod installed. The silicone sealant shall be placed according to the manufacturer's recommendations and to the shape and dimensions shown in the Plans. The sealant thickness shall be as shown on the Plans as measured in the center of the joint at the thinnest point. The sealant thickness shall be measured during installation approximately every two feet (600 mm). Adjustments to correct sealant thickness to within tolerance shall be made immediately before the sealant begins to set up. Sealant placement will only be permitted with the air and substrate temperatures are above 41 degrees F (5 degrees C) and 5 degrees F (2.8 degrees C) above the dew point. The joint shall be kept clean and dry during sealing. If the joint becomes wet and/or dirty during sealing, the operation shall stop until the joint has been restored to a clean and dry state.

Sealing shall be performed using a pneumatic gun approved by the sealant manufacturer. Prior to sealing, the gun shall be inspected to insure that it is in proper working order and that it is being operated at the recommended air pressure. The gun shall demonstrate proper mixing action before sealant is placed in the joint. All unmixed sealant found in the joint shall be removed and replaced. After the Engineer has determined that the pneumatic gun is functioning properly, the joint shall be sealed to the thickness and depth as shown on the Plans.

The sealant shall achieve initial set before opening the joint to traffic.

End of seal treatment at vertical faces of curbs, sidewalks or parapets shall be as recommended by the manufacturer and as shown on the Plans.

After a joint has been sealed, all excess sealant or other residue on the bridge deck surface shall be removed. Traffic shall not be permitted over sealed joints until the sealant is tack-free and until debris from traffic does not imbed into the sealant.

Sealant placed incorrectly, shall be removed and replaced by the Contractor at no additional cost to the Department. Any failure of the sealed joint due to lack of adhesion or cohesion of joint material; improper or unsatisfactory workmanship by the Contractor; or damage by the Contractor's operations or traffic will be cause for rejection. The joint shall be repaired to the Engineer's satisfaction at no additional cost to the Department.

**Method of Measurement:**

The quantity of Silicone Joint Seal will be measured in the field by the number of linear feet of the size(s) placed and accepted.

**Basis of Payment:**

The quantity of Silicone Joint Seal will be paid for at the Contract unit price per linear foot of the size(s) applicable to the Contract. Price and payment shall constitute full compensation for furnishing and placing all materials, including the removal of the existing joint material, cleaning and preparing the joint, for all labor, equipment, tools and incidentals necessary to complete the work.

When a polymer concrete nosing is specified, it shall not be included in this item but will be paid for according to item 602602 – Polymer Concrete.



**605709 – WELD REPAIRS**

**Description:**

This work item consists of furnishing all materials and equipment to perform weld repairs in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

None

**Construction Methods:**

When removing cracked welds it is imperative that the cracked weld be fully removed without damaging the base metal. In the case of cracked tack welds, the entire length of the tack weld shall be removed. After the cracked weld has been removed, the base metal shall be tested using Non-Destructive Testing (NDT) techniques to ensure that the crack has been fully removed. All work shall meet the requirements of the current edition of the AASHTO/AWS D1.5 Bridge Welding Code.

Cracked tack welds shall be removed by grinding using a die grinder, a 1/4" (6 mm) drill with a butter bit, a grinding pad, a small grinder, or a rotary file.

**Method of Measurement:**

The quantity of weld repairs will be measured as the number of each cracked tack weld removed and accepted.

**Basis of Payment:**

The payment for the item shall be made for at the Contract unit price bid per each for item 605709 – Weld Repairs, which price and payment shall constitute full compensation for furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

8/17/12

**605732 – REPLACE STEEL TAP BOLT**

**Description:**

This work item consists of furnishing all materials and equipment to remove and replace broken tap bolts in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

New tap bolt shall match existing, see Plans for details.

**Construction Methods:**

Broken tap bolt shall be removed and replaced in accordance with the notes on the Plans.

**Method of Measurement:**

The quantity of broken tap bolt repairs will be measured as the number of each broken tap bolt removed, replaced, and accepted.

**Basis of Payment:**

The payment for the item shall be made for at the Contract unit price bid per each for item 605732 – Replace Steel Tap Bolt, which price and payment shall constitute full compensation for furnishing all material, labor, equipment, tools, and incidentals necessary to complete the work.

6/21/2012

**605733 – PIN AND HANGER RETROFIT****Description:**

This work item consists of furnishing all materials, fabricating, delivering, and installing a pin & hanger retrofit in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

All 150 ksi bar material for the pin and hanger retrofit shall be cold drawn quenched and tempered alloy steel that conforms to AASHTO M 275 (ASTM A 722). The bar material shall have a cold threaded continuous rolled-in pattern of thread-like deformations. The strength of the anchorage hardware shall meet the requirements of ACI 318 and the PTI Acceptance standards for Post-Tensioning Systems. Bar properties shall meet the following criteria:

Nominal Bar Diameter	Ultimate Stress	Cross Section Area	Ultimate Strength	Yield Strength	Maximum Bar Diameter
<i>in.</i>	$f_{pu}$ <i>ksi</i>	$A_{ps}$ <i>in.2</i>	<i>kips</i>	<i>kips</i>	<i>in.</i>
1 $\frac{3}{4}$ "	150	2.60	400	320	2.00

The modulus of elasticity,  $E$ , of the 150 ksi bar material shall be 29 700 ksi. The bar material shall meet or exceed the deformation requirements of AASHTO M 31 (ASTM A 615) for concrete reinforcing bars. Mill certifications and certificates of conformance for all bar material shall be provided with each shipment.

Bar material for hanger rods shall be painted in accordance with item 605522 – Urethane Paint System, Existing Steel. Bar material shall be delivered to the field with a shop coat of primer. The ends of the rods shall be bare (no primer) to ensure proper fastening of anchor nuts.

All structural steel for the pin and hanger retrofit shall be AASHTO M 270 (ASTM A 709), Grade 50W (including base plates and anchor plates).

All high strength bolts for the pin and hanger retrofit shall be AASHTO M 253 (ASTM A 490), Type 3. All nuts and washers shall be AASHTO M 291 (ASTM A 563) and AASHTO M 293 (ASTM F 436), respectively.

The protective nylon caps for anchor nuts shall be compatible with the 150 ksi bars and shall be supplied by the bar manufacturer.

Paint for all new steel shall meet the requirements of Section 605 of the Standard Specifications. Paint for existing steel shall meet the requirements of item 605522 – Urethane Paint System, Existing Steel.

Metal reinforced epoxy filler and silicone caulking shall meet the requirements shown on the Plans.

The Contractor shall furnish to the Engineer a Certificate of Compliance certifying that the above materials comply with the applicable Contract specifications. A copy of all test results performed by the Contractor or his supplier necessary to assure Contract compliance shall also be furnished to the Engineer.

**Working Drawings:**

Prior to beginning any work, the Contractor shall submit all pertinent working drawings and erection methods to the Engineer for review and approval. This submittal shall include, at a minimum, the following information:

1. Contractor's field measurements for verification of existing and proposed dimensions.
2. Fabricator's detailed shop drawings of all components of the pin and hanger retrofit.

3. Contractor's detailed proposed method of installation.
4. Contractor's detailed drawings and calculations for all falsework to be used during the installation of the pin and hanger retrofit. Drawings and calculations shall be stamped by a Professional Engineer licensed in the State of Delaware with a valid signature and date signed. All designs shall be in accordance with the latest editions of AASHTO, including but not limited to, Construction Handbook for Bridge Temporary Works, and Guide Design Specifications for Bridge Temporary Works, as well as all Department guidelines and manuals.
5. Certification that all material meets the specifications required by this special provision.

Any fabrication done before acceptance of the working drawings will be at the Contractor's risk.

The Contractor shall prepare and submit the working drawings, calculations and erection methods for review and approval as soon as possible after the Notice to Proceed. Any delay in submission and acceptance of a proposed design will not extend the contract time.

#### **Construction Methods:**

Prior to the fabrication of any material, the Contractor, in the presence of the Engineer, shall field verify all existing and proposed dimensions shown on the Plans. The size of all repair plates and location of all existing and proposed bolt holes shall be field verified by the Contractor prior to fabrication.

Bolt holes in new plates shall be shop drilled wherever possible. If bolt holes in a new plate are required to match existing bolt holes they shall be field drilled to ensure proper alignment of bolt holes. When drilling holes in existing steel a drilling template shall be used in order to ensure proper alignment and fit-up of members.

The Contractor shall take extreme care when field drilling holes in existing gusset plates and other structural members. Any errors or damage to the existing structure due to the Contractor's operations shall be repaired at the Contractor's expense to the satisfaction of the Engineer and Department.

Prior to placing all new steel for the pin and hanger retrofit, the existing steel to be in contact with new steel shall be cleaned and primed in conformance with item 605532 – Cleaning Existing Steel Structures (Non-hazardous Base) and item 605522 - Urethane Paint System, Existing Steel, respectively. Existing steel shall be cleaned to an SSPC SP3 finish. Voids and pitting left by the cleaning operation shall be filled with a metal reinforced epoxy filler prior to installing new plates. The perimeter of all new plates shall be caulked.

Fabrication and painting of all new steel for the pin and hanger retrofit shall be in conformance with applicable provisions of Section 605 of the Standard Specifications. Both the primer and first coat shall be shop applied. The top coat shall be field applied and conform to item 605522 - Urethane Paint System, Existing Steel. Painting of the existing steel shall conform to item 605522 - Urethane Paint System, Existing Steel.

The new hanger rods shall be post-tensioned only after all retrofit plates are in place with all bolts fully tightened. The Contractor shall monitor the load in the rods as it is being applied. The rods shall be tensioned simultaneously using manifolded jacks. All four (4) jacks to be used in the tensioning shall be of the same model and manufacturer. The tensioning shall be applied at a rate as recommended by the hanger rod manufacturer.

The new rods shall be parallel to each other and to the existing hanger when assembled in the vertical position at 68 degrees F. See the Plans for additional geometry.

#### **Safe Handling of High Strength Steel, 150 ksi Bar Material:**

1. Do not damage the surface of the bar.
2. Do not weld or burn so that sparks or hot slag will touch any portion of the bar which will be under stress.
3. Bar shall not be subject to the heat of a torch, welding, or used as a ground.
4. Field cutting shall be done with an abrasive wheel or band saw.
5. Do not use a bar that has been kinked or contains a sharp bend.

#### **Method of Measurement:**

The quantity of Pin and Hanger Retrofit will not be measured.

**Basis of Payment:**

The quantity of Pin and Hanger Retrofit will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing and installing all materials in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions. Payment will be full compensation for fabrication and delivery of all new material, field drilling of holes as required, metal-reinforced epoxy filler, caulking, installation, painting of all new steel, post-tensioning of bar material, along with all appurtenant materials, and for all labor, materials, equipment, tools, and incidentals necessary to complete the work. Cleaning of the existing steel surfaces shall be paid for under item 605532 – Cleaning Existing Steel Structures (Non-hazardous Base). Painting of the existing steel shall be paid for under item 605522 - Urethane Paint System, Existing Steel.

8/20/2012



## **610502 - POINTING EXISTING STONE MASONRY**

### **Description:**

This work consists of furnishing all materials, raking out crumbling and deteriorated mortar from the masonry joints and pointing with fresh mortar in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

### **Materials:**

Portland cement, fine aggregate, water and hydrated lime required for preparing the mortar shall conform to Section 610 of the Standard Specifications.

Mortar shall be prepared in accordance with Subsection 610.09 of the Standard Specifications. All requirements for mortar noted in the Plans shall be followed and in case of a conflict between the Plans and Section 610 of the Standard Specifications, the Plans shall prevail. Additives, as approved by the Department, may be introduced into the mix to speed up set time for applications under water.

To the most practical extent possible, all existing stone (if salvageable) shall be reused. Unless indicated, all new stone with exterior elevation and appearance shall meet pre-existing and original design conditions. Any additional stones required for masonry repairs shall closely match the color, texture, size, and type of the existing stones.

### **Requirements:**

The Contractor shall hire a qualified or licensed stone mason, brick, or concrete/stucco subcontractor with experience in the reconstruction or restoration of stone masonry structures, exteriors and/or buildings.

Specific guidelines for masonry repairs have been established to ensure that work is in compliance with the "Secretary of the Interior's Standards for Rehabilitation." Although general in nature, the associated "Guidelines for Rehabilitating Historic Buildings: Masonry" offer some general avoidance measures when repairing masonry.

Treatments that should not be done unless approved in advance by the Engineer include but are not limited to:

- Removing non-deteriorated mortar joints, then re-pointing the entire structure (abutment, wingwalls, piers) to achieve a uniform appearance.
- Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repointing.
- Repointing with mortar of high Portland cement content (unless it is the content of the historic mortar). This can often create a bond that is stronger than the historic material and can cause damage as a result of the differing coefficient of expansion and different porosity of the material and the mortar.
- Repointing with a synthetic caulking compound.
- Using a "scrub" coating technique to repoint instead of traditional repointing methods.
- Changing the width or joint profile when repointing.

Recommended treatments include:

- Remove deteriorated mortar by carefully hand-raking the joints to avoid damaging the masonry.
- Duplicate old mortar in strength, composition, color, and texture.
- Duplicate old mortar joints in width and in joint profile.

Further and more defined instructions for the treatment of masonry elements in compliance with the Secretary's Standards for Rehabilitation can be found in Preservation Brief #2, "Repointing Mortar Joints in Historic Masonry Buildings" (National Park Service, Heritage Preservation Services, <http://www.nps.gov/history/hps/tps/briefs/brief02.htm>). This attached reference guide suggests appropriate materials and methods for repointing masonry, and should be used by the Contractor in order to receive Department approval.

Some key points of the brief include:

- The new mortar must match the historic mortar in color, texture, and tooling.
- The new sand must match the sand in the historic mortar, which will establish the color and texture match.
- The new mortar must have greater vapor permeability and be softer than the masonry units.
- The new mortar must be as vapor permeable and as soft or softer than the historic mortar, however the minimum compressive strength shall be 1000 psi.

Following these guidelines, the Contractor will prepare a test panel(s) in a discrete area on the bridge (abutment/wingwall/pier) to demonstrate the ability to repair the stone masonry in compliance with the secretary of the interior's standards for rehabilitation. The Contractor, with assistance of the District Engineer, will arrange an onsite inspection meeting with representatives from the Department to review and approve the sample test panel before permitting the Contractor to proceed with additional work needs.

### **Construction Methods:**

All deteriorated and loose existing mortar shall be raked clean from the joints. After removing the deteriorated mortar, the cavity shall be cleaned with water under high pressure. Any existing voids which are readily accessible shall be cleaned and packed with mortar or other appropriate means as approved by the Engineer. All mismatched mortar between stones, i.e. mortar contrasting in color, strength, and texture to the original design, including that which appears to have been placed as a maintenance or temporary patching repair, shall be removed and replaced with fresh mortar. All new fresh mortar used shall match historic mortar in strength, composition, color, texture, and joint profile. The mason shall be careful to not disturb any existing mortar points or stones that are neither missing nor deteriorated.

At the discretion of the Engineer, all loose stones on the bridge shall be reset and repointed.

All joints shall be thoroughly wetted prior to applying the mortar. No mortar shall be applied in freezing weather. In hot or dry weather the pointed work shall be satisfactorily protected from the sun and kept wet for a period of three (3) days after application.

After the mortar has sufficiently set, the area that will be exposed after completion shall be thoroughly cleaned to remove efflorescence, excess mortar, scars or spots and shall present a surface showing the natural color of the stone. The cleaning shall be performed with water and/or a solution of hydrochloric acid (3 parts hydrochloric acid to 100 parts water). After use of the acid solution, the area shall be thoroughly washed down with water. If the acid solution causes any deterioration to the stone, its use shall be stopped and the area thoroughly flushed with water.

### **Method of Measurement:**

The quantity of pointing will be measured as the actual number of linear feet (meters) of joints that was pointed and accepted.

### **Basis of Payment:**

The quantity of pointing will be paid for at the Contract unit price per linear foot (meter). Price and payment will constitute full compensation for furnishing all materials including preparation of a test panel(s), Portland cement mortar, removal of deteriorated mortar/concrete, preparation of surface areas, cleaning and packing of voids, re-setting of stones, application of mortar, finishing, curing, cleaning, and for all labor, tools, equipment and incidentals necessary to complete the work.

6/21/12

## **611503 - GRAFFITI REMOVAL**

### **Description:**

The item shall consist of furnishing all materials and labor necessary to remove graffiti markings at the location(s) indicated and in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

### **Location:**

Graffiti markings to be removed under this item are on piers and abutments as specified and indicated on the Plans.

Existing Conditions: The bridge substructure consists of concrete, mortar, and stone masonry.

The Contractor shall make a complete and thorough inventory of all exterior surfaces requiring graffiti removal prior to starting any work. All existing features to be cleaned shall be characterized as to hardness, porosity, surface finish, and soundness of material.

### **Materials and Construction Methods:**

Based on an evaluation of existing conditions, the contractor shall propose to the Engineer the intended materials and methodology to be used to remove the graffiti from the appropriate surfaces. To help facilitate removal, the composition of the graffiti shall be determined through visual observation and/or spot tests with an appropriate solvent.

Prior to approval of all materials and construction methods, the contractor shall demonstrate effectiveness by first applying the graffiti removal technique to a small and inconspicuous section of the facade in the presence of the Engineer. The Engineer shall dictate the desired degree of "cleanliness" that is required for the removal process.

Acceptable graffiti removal techniques for the project shall include the following: handscrubbing with water and nonionic detergent or non-toxic cleaning solvents, light pressure water/solvent cleaning, steam cleaning, application of gels or aerosol spray products, or poulticing with a mild water cleansing. Any handscrubbing shall be done with a soft natural bristle, nylon or fiber brush. Metal bristle brushes shall not be used.

Low-pressure water cleaning may be used on stone masonry. Recommended starting pressure shall be less than 100 psi. If higher pressure is required the Contractor may increase the pressure gradually, but shall not exceed 1000 psi. The Contractor shall take care not to damage the stone and/or mortar joints. Any damage to the existing structure as a result of the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Engineer and the Department at no additional cost to the Department.

Abrasive or blasting-type removal techniques such as grinding and sandblasting shall not be permitted. Any damage to the existing structure by the Contractor's operations shall be repaired and/or replaced in kind at no additional cost to the Department.

Environmental Protection: The Contractor shall take the necessary precautions to protect the adjacent areas and pedestrians from possible environmental contamination resulting from a chemical agent or solvent utilized in the cleaning process. The graffiti removal process shall be coordinated as necessary with DNREC Parks and Recreation Superintendent Andy Roy (302-577-7020 or [Andy.Roy@state.de.us](mailto:Andy.Roy@state.de.us)) and City of Wilmington's Public Works Department Kash Srinivasan (302-576-3069).

All work on the piers and abutments shall conform to the requirements of the Secretary of the Interior's Standards for Rehabilitation and 36 CFR Part 800, Procedures for the Protection of Historic Properties.

In addition, the Contractor shall follow the National Park Service's "Preservation Brief 1 – Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings" (<http://www.nps.gov/hps/tps/briefs/brief01.htm>) for additional guidance on the cleaning of graffiti on the existing bridge.

**Method of Measurement:**

The quantity of graffiti removal will be measured as the actual number of square foot (square meter) of surface cleaned and accepted.

**Basis of Payment:**

The payment for this item shall be made at the Contract unit price bid per square foot (square meter) for the item 611503 – Graffiti Removal, which price and payment shall constitute full compensation for removing graffiti markings at the location(s) indicated on the Plans and to the satisfaction of the Engineer and for all labor, tools, equipment, and necessary incidentals to complete the work.

8/20/2012

**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, and notes on the Plans, as directed by the Engineer, and as required with these Special Provisions. The PVC pipe shall be used for subsurface drainage, bridge downspout drainage, or for serving as conduit as specified on the Plans.

**Materials and Construction Methods:**

The PVC pipe and fittings shall be free from defects and shall conform to the applicable requirements of ASTM D 3034 Type PSM, and pipe shall be of SDR-35 or SDR-41 or SDR-42 for subsurface drainage pipe and bridge downspout drainage 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 D 2466 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 all hanger supports for bridge mounted drains and conduits, 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.

8/16/12

**720585 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1 - 31**  
**720586 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2 - 31**  
**720588 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3 - 31**

**Description:**

This work consists of furnishing and installing an impact attenuating guardrail end treatment in accordance with the locations, notes and details on the Plans, the Standard Construction Details, these Special Provisions, and as directed by the Engineer.

**Materials:**

The end treatment system shall meet the requirements of NCHRP Report No. 350 Test Level 3. The Guardrail End Treatment, Type 1 shall be designed for installation parallel to the roadway. The Guardrail End Treatment, Type 2 shall be designed for installation with the end flared back from the roadway. The Guardrail End Treatment, Type 3 shall be designed for installation where 2 runs of guardrail come together.

The entire end treatment shall be designed for quick and easy replacement after an impact.

Guardrail End Treatment Attenuator Type 1 shall have a minimum of 2 square feet (0.2 square meters) of yellow retroreflective material on the nose. Guardrail End Treatment Attenuator, Type 2 and Type 3 shall have a minimum of 3 square feet (0.3 square meters) of yellow retroreflective material on the nose.

The Contractor shall submit shop drawings, the manufacturer's certification, and the manufacturer's installation instructions to the Engineer. Installation cannot begin until these submissions have been approved by the Engineer.

**Construction Methods:**

The end treatment system shall be fabricated and installed in accordance with the manufacturer's recommendations and details shown on the Plans.

The end treatment system shall be installed so that there is no rigid object projecting more 4 (100 mm) above ground level in that portion of the attenuator impacted and broken away by an errant vehicle. It is the intent that the errant vehicle not be snagged by an embedded component of the end treatment attenuator.

The grading between the edge of pavement and the end treatment shall be 10:1 or flatter for the length of the end treatment.

Reflectorized washers are not to be used on attenuators unless specified and/or approved by the manufacturer.

The Guardrail End Treatment Attenuator, Type 1 shall be installed with steel tubes and soil plates for the first 4 (min.) wood post. As an alternate, the first 4 (min.) post may be hinged, breakaway steel post if the manufacturer's specifications permit.

Unless otherwise noted on the Plans, the Guardrail End Treatment Attenuator, Type 1 shall be installed with a 50:1 taper beginning 50' (15 m) from the end of the end treatment.

**Method of Measurement:**

The quantity of guardrail end treatment attenuators will be measured as the number of each type fabricated, installed and accepted.

Note: All guardrail end treatment attenuators will be considered as 50 feet (15 meters) long. The 50' (15 m) length will begin at the center of the nose post and extend back along the attenuator and guardrail to which it is attached. Any guardrail within the 50' (15 m) length will be considered as part of the guardrail end treatment attenuator and not be measured separately. Measurement for the guardrail will begin 50' (15 m) from the center of the nose post of the attenuator.

**Basis of Payment:**

The quantity of guardrail end treatment attenuators will be paid for at the Contract unit price per each type of guardrail end treatment attenuator. Price and payment will constitute full compensation for furnishing all materials, fabrication and installation and for all materials, labor, equipment, tools and incidentals required to complete the work.

**Note:** When this item is completely installed, the Contractor may notify the Engineer and request acceptance. The Engineer will make an inspection of the installation and the Contractor shall correct any deficiencies. Once the corrective work is completed to the satisfaction of the Engineer, the installation will be accepted and the Contractor will be relieved from the responsibility for this item. If this item is damaged before the final acceptance of the project, and the damage is not the result of the Contractor's negligence, the Engineer will notify the Contractor to make repairs, and the Contractor will make repairs at the unit price bid (in the case of complete replacement) or at a negotiated price (in the case of partial replacement or repair). Damage caused by the Contractor shall be repaired at no cost to the Department.

4/7/11

**727547 - REMOVAL OF FENCE**

**Description:**

This work consists of the removal, wholly or in part, of bridge mounted and ground mounted chain link fence, and the backfilling of cavities caused by post removal in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Construction Methods:**

**Bridge Mounted Fence Removal:**

The Contractor shall remove the chain link wire fabric from the fence posts. The steel posts shall be removed from the concrete parapet and the voids in the parapets packed with non-shrink grout as shown in the details on the Plans.

**Ground Mounted Fence Removal:**

The Contractor shall remove the damaged chain link wire fabric and fence posts in accordance with the Plans and as directed by the Engineer. Any voids left in the ground from fence post removal shall be backfilled as directed by the Engineer.

**Method of Measurement:**

The chain link fence designated on the plans to be removed will be the number of linear feet measured in-place prior to removal.

**Basis of Payment:**

The payment for this item shall be made at the Contract unit price bid per linear foot (meter) for item 727547 – “Removal of Fence,” which price and payment shall constitute full compensation for the removal of the chain link fence and backfilling of cavities in accordance with the Plans to the satisfaction of the Engineer and for all labor, tools, equipment, materials, and necessary incidentals to complete the work.

8/17/2012



**735531 - SOIL RETENTION BLANKET MULCH, TYPE 1**  
**735532 - SOIL RETENTION BLANKET MULCH, TYPE 2**  
**735533 - SOIL RETENTION BLANKET MULCH, TYPE 3**  
**735534 - SOIL RETENTION BLANKET MULCH, TYPE 4**  
**735535 - SOIL RETENTION BLANKET MULCH, TYPE 5**  
**735536 - SOIL RETENTION BLANKET MULCH, TYPE 6**  
**735537 - SOIL RETENTION BLANKET MULCH, TYPE 7**

**Description:**

This work consists of furnishing, placing and anchoring soil retention blanket mulch over seeded areas in accordance with notes and details on the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

The blanket mulch shall be one of the pre-approved products listed in the Approved Product List (APL) at the time of bid, for the type(s) of mulch required on the Plans.

Pre-approval procedures and the current APL may be obtained by writing to the Stormwater Engineer, Delaware Department of Transportation, P. O. Box 778, Dover, DE 19903 or calling (302) 760-2177 or viewing DelDOT's web page at [www.deldot.net/business](http://www.deldot.net/business). The Contractor shall submit an 8" x 8" (200 mm x 200 mm) sample to the Stormwater Engineer to verify pre-approval. Also, the Contractor shall submit manufacturer's literature, including installation recommendations, to the Engineer.

The products on the APL have been used extensively on DelDOT projects with satisfactory results and/or have received satisfactory evaluations by the Texas Department of Transportation/Texas Transportation Institute (TxDOT/TTI).

Soil Retention Blanket Mulch, Types 1, 2, 3, 4 and 5, generally referred to as erosion control blankets (ECB), shall be composed entirely of 100% biodegradable material.

Soil Retention Blanket Mulch, Types 6 and 7, generally referred to as turf reinforcement mats (TRM), shall be composed of mostly non-degradable material.

In order for a product to be added to DelDOT's Approved Product List and be eligible for use in DelDOT's construction and maintenance works, the product must meet the above guidelines and receive a satisfactory evaluation by TxDOT/TTI. The Department will remove products from the APL when field performance is unsatisfactory.

**Types of Soil Retention Blanket Mulch Application**

- |                |  |
|----------------|--|
| <b>Type 1.</b> | Sandy soils on slopes steeper than 3H:1V   |
| <b>Type 2.</b> | Sandy soils on slopes equal to or flatter than 3H:1V   |
| <b>Type 3.</b> | Top-soiled slopes steeper than 3H:1V   |
| <b>Type 4.</b> | Top-soiled slopes equal to or flatter than 3H:1V   |
| <b>Type 5.</b> | Top-soiled grass swale at maximum design shear stress less than or equal to two (2) pounds per square foot (96 Pascals)  |
| <b>Type 6.</b> | Top-soiled grass swale at maximum design shear stress greater than two (2) pounds per square foot (96 Pascals) and less than or equal to six (6) pounds per square foot (287 Pascals)    |
| <b>Type 7.</b> | Top-soiled grass swale at maximum design shear stress greater than six (6) pounds per square foot (287 Pascals) and less than or equal to eight (8) pounds per square foot (383 Pascals) |

**Construction Methods.** The soil retention blanket mulch, shall be placed immediately after seeding operations have been completed or as approved by the Engineer, but in no case shall this period exceed 24 hours from the completion of the seeding operation. Prior to seeding and mulching, the area to be mulched shall be tracked, free of ruts, rocks or clods over 1.5 inches (40 millimeters) in maximum dimension and all sticks or other foreign

materials which will prevent the close contact of the blanket with the soil. If as a result of rain, the prepared bed becomes crusted or eroded or if any eroded areas, ruts or depressions exist for any reason, the Contractor shall retrack and reseed the eroded areas.

Except for sprayed blanket mulch installation and anchorage of the soil retention blanket mulch shall be in accordance with notes and details in the Plans and the following DelDOT Standard Construction Details:

Standard No. E-9 for rolled blankets under Types 1 through 5

Standard No. E-25 for blankets under Types 6 and 7

Should the installation requirements of the manufacturer be more stringent than the above, the manufacturer's requirements shall govern.

Sprayed blanket mulches shall be applied as per the manufacturer's instructions and recommended rate. No application shall be permitted if rain is anticipated within 24 hours as determined by the Engineer.

**Method of Measurement:**

The quantity of soil retention blanket mulch will be measured in square yards (meters) of each type soil retention blanket mulch installed and accepted. Measurements for calculating the number of square yards (meters) will be made along the surface of the area covered. Overlaps of materials of any kind will not be measured.

**Basis of Payment:**

The quantity of soil retention blanket mulch will be paid for at the contract unit price per square yard (meter) per each type. Price and payment will constitute full compensation for furnishing and placing all materials; for all methods of anchorage and securement; for repairing any loose or raised pins or pegs or any loose, torn, or undermined fabric; and for all labor, equipment, tools, and incidentals required to complete the work.

6/21/2012

**746647 – REPLACEMENT OF ALUMINUM HANDHOLE COVER AND FASTENERS**

**Description:**

This work item consists of furnishing all materials, fabricating, delivering, and installing new aluminum handhole covers and fasteners in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

Aluminum handhole cover shall be aluminum alloy 6063-T6.

All fasteners shall be aluminum conforming to ASTM F 468 and shall be made of an alloy that is compatible with the handhole cover and pole.

**Construction Methods:**

The Contractor shall fabricate and install new aluminum handhole covers as required by the Plans and as directed by the Engineer to match existing. In the absence of further information, an existing handhole cover from a nearby light pole may be used as a template for fabricating the new handhole cover(s).

Where existing fasteners are sheared off, the Contractor shall remove the broken fasteners using a bolt extractor. The Contractor shall not burn out broken fasteners. Once the broken fasteners have been removed, the hole shall be cleaned and re-tapped. If the broken fastener is unable to be removed, the Contractor shall drill it out. After drilling, new threads shall be tapped. If the new hole is larger than the original, the next larger size fastener shall be used.

**Method of Measurement:**

The installation of new aluminum handhole covers and fasteners to be paid for under this item shall be per each location (i.e. each light pole, etc.) where an aluminum handhole cover and/or fasteners are installed/replaced.

**Basis of Payment:**

The payment for the item shall be made for at the contract unit price bid per Each for 746647 – Replacement of Aluminum Handhole Covers and Fasteners, which price and payment shall constitute full compensation for fabrication and delivery of all new material, removing broken fasteners, cleaning and re-tapping of screw holes, and for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

8/17/2012

**746648 – REPLACEMENT OF STEEL FASTENERS**

**Description:**

This work item consists of furnishing all materials, delivering, and installing new steel fasteners in accordance with the Plans, as directed by the Engineer, and as required by these Special Provisions.

**Materials:**

All fasteners shall be galvanized in accordance with AASHTO M 232 (ASTM A 153) unless otherwise noted in the Plans.

Where stainless steel fasteners are required, they shall conform to ASTM F 593.

**Construction Methods:**

The Contractor shall install new steel fasteners as required by the Plans and as directed by the Engineer. Where existing fasteners are sheared off, the Contractor shall remove the broken fasteners using a bolt extractor. The Contractor shall not burn out broken fasteners. Once the broken fasteners have been removed, the hole shall be cleaned and re-tapped. If the broken fastener is unable to be removed, the Contractor shall drill it out. After drilling, new threads shall be tapped. If the new hole is larger than the original, the next larger size fastener shall be used.

**Method of Measurement:**

The installation of new steel fasteners to be paid for under this item shall be per each location (i.e., each junction box, etc.) where steel fasteners are installed/replaced.

**Basis of Payment:**

The payment for the item shall be made for at the contract unit price bid per each for item 746648 – Replacement of Steel Fasteners, which price and payment shall constitute full compensation for delivery of all new material, removing broken fasteners, cleaning and re-tapping of screw holes, and for all labor, materials, equipment, tools, and incidentals necessary to complete the work.

8/17/2012

**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, hexavalent 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%  $\text{TiO}_2$  (100% purity).

Epoxy Content-WPE (Component A) - The epoxy content of the epoxy resin will be tested in accordance with ASTM D1652 and calculated as the weight per epoxy equivalent (WPE) for both white and yellow. The epoxy content will be determined on a pigment free basis. The epoxy content (WPE) shall meet a target value provided by the manufacturer and approved by the Department's Material and Research Section (from now on will be addressed as Department). A  $\pm 50$  tolerance will be applied to the target value to establish the acceptance range.

Amine Value (Component B) - The amine value of the curing agent shall be tested in accordance with ASTM D2074-66 to determine its total amine value. The total amine value shall meet a target value provided by the manufacturer and approved by the Department. A  $\pm 50$  tolerance will be applied to the target value to establish the acceptance range.

Toxicity - Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

Viscosity - Formulations of each component shall be such that the viscosity of both components shall coincide (within 10%) at a recommended spray application.

## 2. Physical Properties of Mixed Composition:

Unless otherwise noted, all samples are to be prepared and tested at an ambient temperature of  $73 \pm 5$  F. ( $23 \pm 3$  C).

- a. Color. The white epoxy composition when applied at a minimum wet film thickness of  $20 \pm 1$  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  $20 \pm 1$  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  $20 \pm 1$  mils (500  $\mu\text{m}$ ) 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  $\mu$ m) 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 ± 5 F (24 ± 3 C).

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing shall not be less than 24 hours nor more than 96 hours.

Test specimens for compressive strength determinations will be prepared as follows:

Five molds will be prepared from 1/2 (12 mm) I.D., 1/16 (1.5 mm) wall thickness acrylic tubing, cut in 1 1/2 (38 mm) lengths. After spraying the inside of the mold with a suitable release agent,<sup>(1)</sup> 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 milkyiness 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  $\mu$ m to 600  $\mu$ m) mesh spheres shall be the average resistance when tested in accordance with ASTM D1213.

The glass spheres shall have the following grading when tested in accordance with ASTM D1214.

M247 AASHTO Type 1 Glass Spheres

<u>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#20 (850 $\mu$ m)	0	100
#30 (600 $\mu$ m)	5-25	75-95
#50 (300 $\mu$ m)	40-65	15-35
#100 (150 $\mu$ m)	15-35	0-5
Pan	0-5	

Type 4 Large Spheres

<u>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#10 (2000 $\mu$ m)	0	100
#12 (1680 $\mu$ m)	0-5	95-100
#14 (1410 $\mu$ m)	5-20	80-95
#16 (1190 $\mu$ m)	40-80	10-40
#18 (1000 $\mu$ m)	10-40	0-5
#20 (850 $\mu$ m)	0-5	0-2
Pan	0-2	

The AASHTO M247 Type 1 glass spheres shall be treated with a moisture-proof coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The moisture-resistance of the glass spheres shall be determined in accordance with AASHTO M247 test method 4.4.1.

Type IV glass spheres shall be treated with an adhesion coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from



dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The adhesion coating property of the Type IV beads shall be tested in accordance with the dansyl-chloride test.

C. Black Epoxy Contrast Markings

Epoxy Resin Requirements: The two-component, 100% solids, paint shall be formulated and designed to provide a simple volumetric mixing ratio (e.g. 2 part component A to 1 part component B) specifically for service as a hot-spray applied binder for black aggregate in such a manner as to produce maximum adhesion. The material shall be composed of epoxy resins and pigments only.

The paint shall be well mixed in the manufacturing process and shall be free from defects and imperfections that may adversely affect the serviceability of the finished product. The paint shall not thicken, curdle, gel, settle excessively, or otherwise display any objectionable properties after storage. Individual components shall not require mixing prior to use when stored for a maximum of 6 months.

The overall paint composition shall be left to the discretion of the manufacturer, but shall meet the following requirements:

Composition:	<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 F (60 C).
3. The glass spheres shall be gravity dropped upon 20 mils (500 um) of epoxy pavement markings to produce a wet-night-reflective pavement marking. The large spheres (Federal Spec. Type 4) shall be applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. This application rate and the following gradation shall conform to FHWA's FP-96: Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (pages 757-761 Type 3 and Type 4 Beads).
4. The applicator shall be equipped with metering devices or pressure gauges, on the proportioning pumps. Metering devices or pressure gauges shall be visible to the Engineer.
5. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors, and other appurtenances to allow for the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described below in Construction Details, D. Applications of Epoxy Reflectorized Pavement Markings of this Special Provisions.

**Construction Details.**

- A. General: All pavement marking and patterns shall be placed as shown on the Plans or as directed by the Engineer.

Before any pavement markings work is begun, a schedule of operations shall be submitted for the approval of the Engineer. This schedule shall be submitted 2 weeks prior to the application of the striping.

At least five (5) days prior to starting striping the Contractor shall provide the Engineer with the epoxy manufacturer's written instructions for use. These instructions shall include but not be limited to: mixing ratios, application temperatures, and recommendations for use of water spray.

The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of traffic flow shall not be allowed.

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, tracking marks, spilled epoxy or epoxy markings applied in unauthorized areas.

The hot water spray shall not be used in conjunction with markings applications on any pavement surface, or on any existing durable type marking, unless specifically recommended by the manufacturer of the epoxy material.

- B. Atmospheric Conditions: Epoxy pavement markings shall only be applied during conditions of dry weather and on substantially dry pavement surfaces. At the time of installation the pavement surface temperature shall be a minimum of 35° F (2° C) and the ambient temperature shall be a minimum of 35° F (2° C) and rising. The Engineer shall be the sole determiner as to when atmospheric conditions and pavement surface conditions are such to produce satisfactory results.
- C. Surface Preparations: The Contractor shall clean the pavement or existing durable marking to the satisfaction of the Engineer.

Surface cleaning and preparation work shall be performed only in the area of the epoxy markings application.

At the time of application all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease and similar foreign materials. The cost of cleaning these contaminants shall be included in the bid price of this item. Also, the item shall include the cost of removal of the curing component in the area of the epoxy markings application, if concrete curing compounds on new portland cement concrete surfaces have been used. Waterblasting will not be permitted for removal.

- D. Application of White/Yellow Epoxy Reflectorized Pavement Markings: White/yellow epoxy reflectorized pavement markings shall be placed at the widths and patterns designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

White/yellow epoxy pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete and bituminous concrete pavement, including Stone Matrix Asphalt.

Large reflective glass spheres (Federal Spec. Type 4) shall be applied at the rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. Glass spheres shall uniformly cover the length and width of the pavement marking.

- E. Application of Black Epoxy Contrast Pavement Markings: Black epoxy contrast pavement markings shall be placed at the widths designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

Black epoxy contrast pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete surfaces followed by a single drop of graded black aggregate.

The width of black epoxy line shall be applied for the following situations:

Center Skip Line - On Portland cement concrete pavements a black contrast skip line shall be 10 feet (3 m) in length of the same width as the white epoxy reflectorized skip. It is to lead the white skip and stop at the beginning of the white skip. The black contrast skip is to have a single application of graded black aggregate.

Edge Lines - All edge 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 or yellow 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 or yellow line is to be applied on top of it. The reflective line is to be centered along the black contrast line such that a minimum of 2 inches (50 mm) of black contrast marking is visible on either side of the reflective marking.

F. Defective Epoxy Pavement Markings: Epoxy reflectorized pavement markings, which after application and curing are determined by the Engineer to be defective and not in conformance with this specification, shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient film thickness [(less than 20±1 mils (500 µm) as applicable] and line widths; insufficient glass bead coverage or inadequate glass bead retention.

Repair Method: Prepare the surface of the defective epoxy marking by shot blasting, sand blasting, or water blasting. No other cleaning methods will be allowed. Surface preparation shall be performed to the extent that a substantial amount of the reflective glass spheres are removed and a roughened epoxy marking surface remains.

Immediately after surface preparation remove loose particles and foreign debris by brooming or blasting with compressed air.

Repair shall be made by re-striping over the cleaned surface, in accordance with the requirements of this specification and at a full 20±1 mils (500 µm) minimum line thickness as applicable.

2. Uncured or discolored epoxy (brown patches); insufficient bond to pavement surface (or existing durable marking).

Uncured epoxy shall be defined as applied material that fails to cure (dry) in accordance with the requirements of this specification under MATERIALS, A, 2d. DRYING TIME (FIELD); or applied material that fails to cure (dry) within a reasonable time period under actual field conditions, as defined by the Engineer.

Discoloration (brown patches) shall be defined as localized areas or patches of brown or grayish colored epoxy marking material. These areas often occur in a cyclic pattern and also, often are not visible until several days or weeks after markings are applied.

Repair Method: The defective epoxy marking shall be completely removed and cleaned to the underlying pavement surface to the satisfaction of the Engineer.

The extent of removal shall be the defective area plus any adjacent epoxy pavement marking material extending one foot (300 mm) any direction.

After surface preparation work is complete, repair shall be made by re-applying epoxy over the cleaned pavement surface in accordance with the requirements of this specification.

3. Reflectivity for epoxy resin paint.

After satisfactory completion of all striping work and written notification from the Contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. The Contractor may request that tests be conducted on completed phases or portions of the work. Approval of such a request will be

at the discretion of the Engineer. Testing will be done using a LTL-X Retrometer (30 meter geometry). Five readings will be taken per line per mile (1.6 km). Projects less than 1 mile (1.6 km) in length will have a minimum of 5 readings per line. These readings will then be averaged for the overall project average.

The required average minimum initial reflectivity reading in millicandellas shall be:

White 450  
Yellow 325

Any single reading shall not be less than 350 millicandellas for white and 250 millicandellas for yellow. Without exception, any pavement markings installed that does not meet the above average minimum initial reflectivity numbers shall be removed and replaced, at the installation contractor's expense.

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired or replaced as directed by and to the satisfaction of the Engineer.

All work in conjunction with the repair or replacement of defective epoxy reflectorized pavement markings shall be performed by the Contractor at no additional cost to the State.

#### **Method of Measurement:**

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) will be measured by the number of linear feet (meters) of pavement striping line and number of square feet (meter) of symbol installed on the pavement and accepted in accordance with the Plans.

#### **Basis of Payment:**

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) payment will be paid for at the Contract unit price per linear foot (meter) for 3", 4", 5", 6", 8", 9", 10", 12", 14", 16" (75 mm, 100 mm, 125 mm, 150 mm, 200 mm, 225 mm, 250 mm, 300 mm, 350 mm, or 400 mm) line and the Contract unit price per square foot (meter) of symbol. The quantity of permanent pavement marking (white, yellow, or black epoxy resin paint) will be paid for at the Contract unit price per linear foot (meter) of line and the Contract unit price per square foot (meter) of symbol. Price and payment shall include striping layout, cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

#### **NOTE:**

For information only:

The following manufacturers are known to us which manufacturer Epoxy Resin Paint for Pavement Striping. The Department does not endorse or require the use of any of the manufacturers listed below. However, a bidder wishes to use another manufacturer's product, it shall be submitted for review and approval prior to submitting a bid proposal. Should the product be deemed unacceptable by the Department, the successful bidder will be required to use only an approved product.

1. POLY CARB, Inc.  
33095 Bainbridge Road  
Solon, Ohio 44139  
Tel. 1-800-CALLMIX
2. IPS - Ennis Paint  
P.O. Box 13582  
Research Triangle Park, North Carolina 27709  
Tel. 1-877-477-7623
3. Epoplex  
One Park Avenue  
Maple Shade, NJ 08052  
Tel. 1-800-822-6920

4. Or an approved equal.

2/14/12

**748512 - RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 6"**  
**748513 - RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 12"**  
**748514 - RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 8"**  
**748519 - RETROREFLECTIVE PREFORMED PATTERNED MARKING, 4"**  
**748529 - RETROREFLECTIVE PREFORMED PATTERNED MARKING, SYMBOL/LEGEND**  
**748547 - RETROREFLECTIVE PREFORMED PATTERNED CONTRAST MARKINGS, 9"**  
**748556 - RETROREFLECTIVE PREFORMED PATTERNED CONTRAST MARKINGS, 16"**  
**748564 - RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 5"**  
**748565 - RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 10"**  
**748566 - RETROREFLECTIVE PREFORMED PATTERNED CONTRAST MARKINGS, 8"**  
**748567 - RETROREFLECTIVE PREFORMED PATTERNED CONTRAST MARKINGS, 13"**

### **Description:**

This work shall consist of furnishing and installing retroreflective preformed patterned pavement marking in accordance with this provision and in conformance to the existing pavement markings or as established by the Engineer. The Contractor is required to have all subcontractors involved in the placement of these markings attend the pre-placement meeting along with the tape manufacturer representative and Department representatives to coordinate this operation. The subcontractor for pavement markings shall be approved by the Department prior to the preconstruction meeting.

### **Materials:**

**General:** The preformed patterned markings shall consist of white or yellow films with clear microcrystalline ceramic beads incorporated to provide immediate and continuing retroreflection. The markings shall be suitable for application on new or existing P.C. Concrete or bituminous pavements with a pre-coated pressure sensitive adhesive.

The preformed marking material must be used prior to one year from date of manufacture. When not placed by inlaid method a surface preparation adhesive shall be used. The markings shall be capable of providing retroreflection during both wet and dry conditions.

The markings shall be highly durable retroreflective pliant polymer materials designed for longitudinal and word/symbol markings subjected to high traffic volumes and severe wear conditions such as shear action from crossover or encroachment on typical longitudinal configurations such as edge lines and lane lines. This film shall be manufactured without the use of lead chromate pigments or other similar, lead-containing chemicals.

**Composition:** The pavement marking shall consist of a mixture of high quality polymeric materials and pigments with glass beads distributed throughout the base cross-sectional area, with a reflective layer of microcrystalline ceramic beads bonded to a durable polyurethane topcoat surface. The patterned surface shall have approximately 50% plus or minus 15% of the surface area raised and presenting a near vertical face, angled from 0 degrees to 60 degrees, to traffic from any direction. The channels between the raised areas shall be substantially free of exposed beads or particles. The marking shall have a precoated pressure sensitive adhesive. The edges of the markings shall be clean cut and true.

**Retroreflectance:** The white and yellow markings shall have the initial expected retroreflectance values as shown in Table 1 under dry, wet, and rainy conditions. The photometric quantity to be measured shall be coefficient of retroreflected luminance ( $R_L$ ) and shall be expressed as millicandelas per square foot per foot-candle [ $(\text{mcd ft}^{-2}) \text{ fc}^{-1}$ ]. The metric equivalent shall be expressed as millicandelas per square meter per lux [ $(\text{mcd m}^{-2}) \text{ lx}^{-1}$ ].

Retroreflectance values shall be measured under dry conditions in accordance with the testing procedures of ASTM D4061. Retroreflectance values shall be measured under wet conditions in accordance with ASTM E2176 or ASTM E2177. Wet retroreflectance values measured under a "condition of continuous wetting" (simulated rain) shall be in accordance with ASTM E2176. Wet retroreflectance values measured under a "condition of wetness" shall be in accordance with ASTM E2177.

<b>Table 1</b>		
<b>Expected Initial <math>R_L</math> under dry, wet, and rainy conditions</b>		
<u>White</u>	<u>Dry</u>	<u>Wet &amp; Rainy</u>
Entrance Angle	88.76	88.76
Observation Angle	1.05	1.05
Retroreflected Luminance	500	250
$R_L [(mcd \ m^{-2}) \ lx^{-1}]$		
<u>Yellow</u>	<u>Dry</u>	<u>Wet &amp; Rainy</u>
Entrance Angle	88.76	88.76
Observation Angle	1.05	1.05
Retroreflected Luminance	300	250
$R_L [(mcd \ m^{-2}) \ lx^{-1}]$		

**Beads, Index of Refraction:** All “dry-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 1.70 when tested using the liquid oil immersion method. All “wet-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 2.30 when tested using the liquid oil immersion method. The glass beads mixed into the pliant polymer shall have a minimum index of refraction of 1.5 when tested by the liquid oil immersion method.

**Beads, Acid Resistance:** The beads shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7 cc of concentrated acid into 1000 cc of distilled water.

**Color:** The markings shall consist of white and/or yellow films with pigments selected and blended to conform to standard highway colors.

**Skid Resistance:** The patterned surface of the markings shall provide an initial average skid resistance value of 45 BPN when tested according to ASTM E 303.

**Patchability:** The pavement marking material shall be capable of use for patching worn areas of the same type in accordance with manufacturer's instructions.

**Thickness:** The patterned material without adhesive shall have a minimum caliper of 0.065 inches (1.651mm) at the thickest portion of the patterned cross section and a minimum caliper of 0.020 inches (.508mm) at the thinnest portion of the cross section.

**Tolerance:** The Contractor will be responsible for applying these markings in a straight manner not exceeding 1/2 (12 mm) per 40 (12 m). Any markings exceeding the 1/2 (12 mm) tolerance will require the Contractor to make corrective action approved by the Engineer and the tape manufacturer representative at no extra cost to the Department.

#### **Construction Methods:**

The Contractor shall be certified, by the manufacturer, in the installation of the pavement marking material prior to the start of the markings. The Contractor shall install the pavement marking material in accordance with the manufacturer's published recommendations.

The manufacturer shall provide technical assistance as required to ensure successful installation of the markings. This shall include a representative on site for the start of the markings, training, product information, problem solving, etc.

Installation of the pavement markings shall be performed in a neat and workmanlike manner. The Contractor shall premark the pavement to ensure correct location of markings and such layout work shall be incidental to the price bid for the pavement marking items. The method for premarking should be as recommended by the manufacturer. A thin layer of paint as a premarking is not recommended. Particular care shall be taken to ensure that the leading edges of the markings are secured to the pavement.

General application rules:

The Air and surface temperature shall be a minimum of 40 °F.

The pavement must be clean and dry. 24 hours of dry weather where no rain is expected. When not placed by inlaid method a surface preparation adhesive shall be used.

Do not overlap tape - use butt splice.

Do not apply tape on longitudinal seams or joints or cracks.

Do not apply tape on deteriorating pavement surfaces.

Existing markings must be 80% removed.

After application, the markings shall be immediately ready for use by traffic.

#### **Inlay into Fresh Bituminous Concrete:**

When markings are specified in the contract for newly paved asphalt concrete surfaces, they shall be applied before public traffic is allowed on the freshly paved surface - the pavement markings shall be inlaid in the fresh surface during final rolling of the mat, in accordance with the manufacturer's recommendations unless otherwise directed by Engineer.

The Contractor shall show how the pavement mats will be placed to avoid applying the tape on longitudinal seams or joints or cracks and maintain correct marking location.

The Contractor shall employ a sufficient number of workers to premark the pavement and install the markings such that all markings are inlaid into the hot pavement prior to the finish rolling. No paving shall be permitted unless the striping crew and materials are on the project site.

- \* General procedure for inlay application on fresh asphalt surfaces:
- \* Tape is applied after the compaction roller and before the finish roller using minimum water, slow speed and no vibration.
- \* Tape shall be applied using equipment recommended by manufacturer
- \* Tamping shall be done by the finish roller and in the same direction the tape was applied. A separate roller of a size approved by the tape manufacturer may be required to meet the manufacturer's requirements.
- \* Roller shall use minimum speed to prevent wrinkling the tape.
- \* Asphalt temperatures shall be between 180 °F (66 °C) and 120 °F (49 °C) when tape is applied.

**NOTE:** Even though the tape will stand these high temperatures the contractor is to use caution to assure the asphalt is firm enough to walk on above 140 °F (60 °C).

#### **Placement on new P.C. Concrete Pavement:**

When markings are specified in the contract for new P.C. concrete pavement surfaces they shall be applied after the concrete has adequately cured as determined by the Engineer and prior to opening to traffic.



1. When a membrane curing compound has been applied to the concrete surface, it shall be removed by sandblasting prior to applying the markings. Cost for such sandblasting shall be incidental to the price bid for the pavement marking item. The road shall be cleaned by sweeping and with high pressure air.
2. The manufacturer shall specify a primer/solvent for the pavement surface.
3. The tape shall be applied with an approved applicator.
4. The tape shall be tamped with a roller tamper cart with a minimum 200 lb (90 kg) load or by slowly (2-3 mph [3-5 km/hr]) driving over the tape with a vehicle tire. Do not twist or turn on the tape. A minimum of three passes back and forth over the tape will be required. All edges of the tape shall be thoroughly tamped.

**Placement on Existing Pavement:**

When markings are specified in the contract for existing pavement, the pavement surface shall be free of any existing markings.

1. The road shall be cleaned by sweeping and with high pressure air.

Steps 2 through 4 are the same as for new P.C. C. pavement.

**Method of Measurement:**

This work will be measured for payment by the number of linear feet (meters) of line or square foot (meter) of symbol/legend of Retroreflective Preformed Patterned Markings installed on the pavement and accepted in accordance with the plans.

**Basis of Payment:**

This work will be paid for at the contract unit price bid per linear foot (meter) of line or square meter of symbol/legend as measured for item "Retroreflective Preformed Patterned Markings" of the type specified. This price shall include cleaning and preparing the pavement surface, furnishing and placing all materials, for all labor, tools, equipment, maintenance bond and incidentals necessary to complete the work.

**WARRANTY**

The Contractor shall warrant to the Department that the installed retroreflective preformed patterned pavement markings are free of defects, as hereafter defined, for one calendar year 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 show no fading, lifting, shrinking, tearing, rollback, distortion or chipping due to vehicular traffic or normal maintenance activities including snow plowing. Although some wear is expected, the markings shall remain intact and serviceable (as defined below) for no less than 95% of the total item quantities in the first year of installation.

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 unless weather limitations prevent the corrective work. Should the contractor not commence work within seventy-two hours, 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 responsible of the contractor. These costs shall include, but are not limited to, removal, material, maintenance of traffic, etc.

**Maintenance Bond:**

Upon completion of the work, the Contractor shall submit to the Department a Maintenance Bond to insure the State of Delaware during the above Warranty periods. The Maintenance Bond shall meet the following

requirements:

- a) A sum equal to 100% of the value of all Retroreflective Preformed Patterned Markings Items paid to the Contractor;
- b) All signatures are original signatures, in ink, and not mechanical reproductions or facsimiles of any kind;
- c) The Contractor is the named principle;
- d) The term of the bond is for one full year;
- e) The term of the Maintenance Bond will be for a period of one year beyond completion of Retroreflective Preformed Patterned Markings; and
- f) Written by a Surety or insurance company that is in good standing and currently licensed to write surety bonds in the State of Delaware by the Delaware Department of Insurance.

**MANUFACTURER'S RESPONSIBILITY:**

The following information is for use by DelDOT only. The Contractor will not be held responsible for the time frames listed in the chart below.

After satisfactory completion of the one-year warranty period, the contractor will be relieved of his responsibility and the Department shall work directly with the Manufacturer to guarantee the remainder of the warranty as specified below.

In addition, the pavement markings shall warrant the material to retain a minimum reflective value of 150 millicandelas per square foot (meter) per lux for the first year after initial acceptance.

- 1. All reflectance measurements shall be made on a clean, dry surface at a minimum temperature of 40 F (4 C).
- 2. All reflectance measurements shall be made using a "LTL 2000" retroreflectometer.
- 3. One year from initial installation acceptance all pavement marking material shall meet the minimum retained coefficient of dry retroreflection value of 125 millicandelas per foot squared per foot-candle (in accordance with ASTM E1710), and meet the minimum retained coefficient of wet retroreflection value of 75 millicandelas per foot squared per foot-candle (in accordance with ASTM E2177) for the following Warranty Periods.

<b>Warranty Periods</b>		
Application	Dry Retroreflectivity Warranty Period	Wet Retroreflectivity Warranty Period
Longitudinal Markings	4 years	2 years
Symbols and Legends	2 years	1 year

03/04/2011

**748525 - TEMPORARY MARKINGS, TAPE, 4"**  
**748526 - TEMPORARY MARKINGS, TAPE, 6"**  
**748527 - TEMPORARY MARKINGS, TAPE, WORDS/SYMBOLS**  
**748570 - TEMPORARY MARKINGS, TAPE, 5"**

**Description:**

This work shall consist of furnishing, installing, removing or obliterating pavement markings in work zones in accordance with this provision and in reasonably close conformity with the dimensions and lines shown on the plans or established by the Engineer.

**Materials:**

The markings shall consist of white or yellow retro reflective pavement marking on a conformable backing.

The quality of the pavement marking shall be such that the performance requirements for the marking shall be met.

The markings shall be precoated with a pressure sensitive adhesive and shall be capable of being adhered to Asphalt concrete or Portland cement concrete at temperatures as low as 50 F (10 C) in accordance with the manufacturer's recommendations. A surface preparation adhesive recommended by the manufacturer shall be used for all applications to improve initial and long term adhesion.

When stored in a cool dry area indoors, the materials shall be suitable for use for one year after the date of purchase.

**Classification:**

The removable retro reflective pavement marking tape must be designed and constructed in such a manner that it can be readily removed when the markings are no longer applicable. The tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large pieces. The tape shall be wet and dry reflective throughout its useful life. (A normal construction season is defined as the time after the last snowplowing in the spring and before the first snowplowing in the fall/winter. In non-snow removal locations, a normal construction season is limited to the calendar year at the time of installation.)

**Requirements:**

**Composition**

The removable, retro reflective pavement markings shall consist of a highly reflective white or yellow enclosed lens pavement marking with a thin, flexible, conformable backing which is precoated with a pressure sensitive adhesive.

**Retro reflectance**

The enclosed lens white and yellow pavement markings shall have the initial minimum retroreflectance values as shown in Table 1 under dry, wet, and rainy conditions at 1.05° observation angle and 88.76° entrance angle. These angles represent a simulated driver viewing geometry at 30 meters distance. The photometric quantity to be measured shall be the coefficient of retroreflected luminance ( $R_L$ ), and shall be expressed as millicandelas per square meter per lux  $[(\text{mcd m}^{-2}) \text{ lx}^{-1}]$ . The English equivalent shall be expressed as millicandelas per square foot per foot candle  $[(\text{mcd ft}^{-2}) \text{ fc}^{-1}]$

Retroreflectance values shall be measured under dry conditions in accordance with ASTM D 4061. The angular aperture of both the photoreceptor and light projector shall be 6 minutes of arc. The reference center shall be the geometric center of the sample, and the reference axis shall be taken perpendicular to the test sample.

Values measured under wet conditions shall be measured in accordance with ASTM E 2176 or ASTM E 2177 using a portable retroreflectometer. Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) shall be in accordance with ASTM E 2176. Wet retroreflectance values measured under a “condition of wetness” shall be in accordance with ASTM E 2177.

Visually, the reflective performance shall be similar whether the material is dry or wet.

Table 1: Minimum initial $R_L$ under dry, wet and rainy conditions		
	White	Yellow
Entrance Angle	88.76	88.76
Observation Angle	1.05	1.05
Retroreflected Luminance	750	450
$R_L$ [(mcd $m^{-2}$ ) $lx^{-1}$ ]		

#### Removability

The marking film shall be removable from Asphalt concrete and Portland cement concrete intact or in large pieces, at temperatures above freezing without the use of heat, solvents, grinding or blasting without permanently scarring the roadway surface.

#### Skid Resistance

The surface of the markings when new provides an average skid resistance value of 50 BPN when tested according to ASTM E 303.

#### Color

The x,y chromaticity co-ordinates for dry markings shall lie within the regions defined by the following corner points:

	1		2		3		4	
	x	y	x	y	x	y	x	y
White	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375
Yellow	0.560	0.440	0.460	0.400	0.420	0.440	0.490	0.510

#### Daytime appearance<sup>1</sup>

The appearance of the marking in daylight or under road lighting conditions can be determined by measuring the reflection in diffuse conditions. The luminance coefficient in diffuse illumination (Qd) is measured using a portable Qd reflectometer incorporating “30 meter” geometry. The Qd shall be greater than 130 [(mcd  $ft^{-2}$ )  $fc^{-1}$ ] when newly applied.

**Note:** The luminance coefficient (Qd) under diffuse illumination represents the brightness of a road marking as seen by drivers of motorized vehicles in typical or average daylight or under road lighting conditions.

<sup>1</sup>Reference CEN Standard EN 1436.

### **Construction Methods:**

Pavement markings in work zones shall be placed in accordance with the following provisions:

At the end of each day's work, pavement markings shall be in place on each paving lift that is open to normal traffic flow. Materials requiring removal shall be specified above, and marking configurations shall be in accordance with the Manual on Uniform Traffic Control Devices.

The pavement markings shall be maintained and replaced by the Contractor without additional compensation until they have served their purpose, at which time the contractor will be required to remove them.

Pavement markings shall be applied to clean dry surfaces in accordance with the manufacturer's installation instructions or a method approved by the Engineer.

**Method of Measurement:**

Linear pavement markings will be measured in linear feet complete-in-place for the width specified.

Removal or obliteration of pavement markings in construction work zones will not be measured for payment, but shall be considered incidental to the work.

**Basis of Payment:**

Retro reflective pavement markings will be paid for at the contract unit price, which price shall be full compensation for cleaning and preparing the pavement surface, for furnishing and placing all materials, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Marking, Tape, linear	Linear Foot
Temporary Marking, Tape, words/symbol	Square foot

7/15/11

**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, burning or 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, approved flat black paint or 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.

01/09/06

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 alkylid 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 ft<sup>2</sup> (9.3 m<sup>2</sup>) and the AASHTO at 3 lb.(1.4 kg) per 100 ft<sup>2</sup> (9.3 m<sup>2</sup>). In combination, the total glass bead coverage shall be 7-8 lb. (3.2-3.6 kg) per 100 ft<sup>2</sup> (9.3 m<sup>2</sup>). 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 ±3°F (-9.4±2°C) exposure period 72 hours. Any cracking shall constitute failure of the material for PCC road surfaces.

**Impact Resistance (Gardner Falling Weight):** A 2" by 7.5" (50 by 190 mm) specimen shall be applied on a course concrete brick. Using a Gardner Impact Tester, a 2 lb (.91 kg) weight is dropped from a height of 80" (2032 mm). The specimen when tested at room temperature 73.4±3°F (23°C) should show no sign of cracking. (Test procedure is in accordance with ASTM D5420-93).



**Packaging:** The flexible preformed retroreflective thermoplastic marking materials, for use as transverse or longitudinal markings as well as legends, arrows and symbols shall be available in flat form material or in rolls. Flat material shall be supplied in maximum of 4' (1.2 m) lengths up to 2' (.6 m) in width. The material shall be packed in suitable cartons clearly labeled for ease of identifying the contents.

**Construction Methods:**

The markings shall be applied in strict accordance with the manufacturer's recommendations on clean and dry surfaces. Marking configurations shall be in accordance with the "Delaware Manual on Uniform Traffic Control Devices, Part 3, Markings."

The preformed retroreflective thermoplastic material shall be fusible to the pavement by means of a propane torch recommended by the manufacturer. Preheating the surface to remove any latent moisture will be done just prior to the placement and installation of the Symbol/ Legend.

No markings shall be placed when the ambient temperature is below 40°F (4°C). The material shall be kept in a location above 55°F (13°C) until just before application.

The supplier shall provide technical services as may be required.

**Method of Measurement:**

The quantity of pavement striping (748541-748545) will be measured by the number of linear feet (linear meters) of 4", 6", 8", 12", or 16" pavement striping line placed and accepted. The quantity of symbol/ legend (748546) will be measured by the number of square feet (meters) of symbol/legend placed and accepted. The quantity of bike symbol, pedestrian symbol, and handicap symbol (748551-748553) will be measured as each placed and accepted. The dimensions for the symbol/legends are as follows:

Bike Rider with Helmet shall be 3' X 5'.

Pedestrian shall be 4' X 8'.

Handicap Symbol shall be 40" X 40".

**Basis of Payment:**

The quantity of pavement striping payment will be paid for at the Contract unit price per linear foot (linear meter) for 4", 6", 8", 12" and 16" (100 mm, 150 mm, 200 mm, 300 mm, and 400 mm) line. The quantity of symbol/legend will be paid for at the Contract unit price per square foot (meter). The quantity of bike symbol, pedestrian symbol, and handicap symbol will be paid for at the Contract unit price per each. Price and payment shall include cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

**Warranty:**

The Contractor shall warrant to the Department that the installed retroreflective preformed thermoplastic pavement markings are free of defects, as hereafter defined, for a period of one winter season beginning at the initial acceptance of the marking installation by the Department. The initial acceptance of the marking installation will occur upon the satisfactory correction of all deficiencies noted in the marking installation during the Final Inspection of the project. The markings shall be warranted against failure due to blistering, excessive cracking, bleeding, staining, discoloration, oil content of the pavement materials, smearing and spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, chipping, spalling, poor adhesion to the pavement materials, vehicular damage, and wear from normal maintenance activities including snow plowing.

The Contractor shall repair all defective areas identified by the Department after initial installation or during the Warranty Period. All repairs shall begin immediately following the notice to the Contractor by the Department unless weather limitations prevent the corrective work. Should the contractor not commence work within the period stated in the notice, weather permitting, and pending severity, the Department reserves the right to remedy the condition and charge the contractor for the work. Any corrective work shall be as recommended by the manufacturer of the marking material and approved by the Department. The Department shall be given notification before the Contractor begins corrective work to allow for inspection of the operation. All costs

associated with the repair work shall be the responsibility of the contractor. These costs shall include, but are not limited to, removal, material, maintenance of traffic, etc.

2/28/09

**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 at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in boring holes constructed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than or equal to 48 inches shall be installed on multiple sign posts under Item 749690 – Installation or Removal of Traffic Sign on Multiple Sign Posts.

**Materials:**

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

**Construction Methods:**

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the DelDOT MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. All signing materials removed from the project shall be returned to the DelDOT Sign Shop without any damage to the sign materials.

**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 DelDOT MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

2/2/11

**749688 - INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" IN DEPTH**  
**749689 - INSTALLATION OF 4" DIAMETER HOLE, GREATER THAN 6" IN DEPTH**

**Description:**

This work consists of boring a hole 4" in diameter averaging 6" in depth into bituminous concrete or P.C.C. surfaces for installing single or multiple sign posts at the locations indicated on the Plans or as directed by an Engineer.

**Materials:**

The Contractor shall provide the equipment necessary to bore a 4" hole into paved surfaces, while maintaining the stability of the surrounding paved or P.C.C. surfaces. The depth of the bored hole shall be to the top of the subbase material.

**Construction Methods:**

The holes shall be bored into pavement or P.C.C. islands, medians, or sidewalk using a mechanical hole borer for such work or other methods approved by the Engineer. The hole shall be 4" in diameter. Holes bigger or smaller than 4" shall be corrected at the Contractor's expense.

**Method of Measurement:**

The number of 4" holes in diameter bored will be measured as the actual number of holes bored and accepted.

**Basis of Payment:**

The quantity of holes bored as required above will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for boring holes at the required depth, and for all labor, equipment, tools, and incidentals required to complete the work.

**Note:**

The cost for installing holes and PVC sleeves for sign posts in newly constructed P.C.C. islands, medians, or sidewalks shall be incidental to the P.C.C. item.

3/23/09

**759501 - FIELD OFFICE, SPECIAL**

**Description:**

The field office work shall consist of furnishing, erecting, equipping, maintaining, and removing a singlewide modular office and adjacent parking area. 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, North Region Construction (NRC) 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" 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 600 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 ten (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 two inches (2 in.) type "C" hot mix on top of minimum six inches (6 in.) graded aggregate subbase. Snow and/or ice shall be removed from the parking area and from the entrance pathways to the field office within twelve (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" 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 four inches (4 in.) 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 (3) times a month during the growing seasons. Cost for this landscaping and maintenance to be incidental to the "Field Office, Special" 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 two (2) 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 (2) 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 (minimum) 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 900-watt new microwave oven. Maintenance of the potable water supply equipment, refrigerator, and microwave shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

Suitable indoor toilet facilities, conforming to the requirements of the State and Local Boards of Health or of other bodies or courts having jurisdiction in the area, shall be provided. When separate facilities for men and women are not available or required, a sign with the wording "Rest Room" (letter heights one inch 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 5 lines consisting of two (2) direct single lines with call forward busy feature, two (2) dedicated computer use line with broadband connection for either DSL or cable, and one (1) dedicated facsimile line and have five (5) key sets consisting of one (1) master key set having privacy feature, and four (4) four-button key sets having privacy feature (one set which may be for wall mounting), 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. Monthly billings for the field office telephone system shall be received and paid by the Contractor. A copy of each bill shall be forwarded to the Project Resident for reimbursement on the subsequent contract pay estimate. The reimbursement will be for the amount of the bill only and shall not include any additional mark-up or profit.

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. Six (6) full size office desks each with filing drawer and fully adjustable ergonomic design swivel chair with armrests and five (5) leg base having wheel casters, one (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 (5) leg base having wheel casters, one (1) large conference table for a minimum of twelve (12) people with surrounding chairs with armrests, two (2) folding tables minimum 6'-0" by 3'-0" each with ergonomic design straight back chair with armrests, one (1) work table, one (1) supply cabinet, two (2) rough plan racks, two (2) legal size filing cabinets with four (4) drawers, two (2) legal size fire-resistant filing cabinets with lock and key with four (4) drawers and meeting fire underwriters' approval for not less than one hour (1 hr.) test, two (2) book shelves minimum 3'-6" by 4'-6", three (3) vertical surface legal size three (3) compartment pockets, two (2) dry erase boards minimum 4'-0" by 3'-0" each with markers and erasers, and two (2) cork bulletin boards minimum height 3'-0" by 2'-0". 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 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 digital cameras with minimum 1/2.7" 4.0 mega pixel, 3X optical / 6X precision digital zoom, 12-bit DXP A/D conversion, 2.5" 123K pixel LCD display, 5-mode program AE and each with dual media slots, SXGA/XGA/VGA image resolution, E-mail mode. Also intelligent flash with red-eye protection, MPEG movie mode, clip motion, light metering, TEXT mode (GIF), playback zoom and resize, white balance, lithium battery system and in-camera picture effects, memory stick/card (minimum 256MB) capability, and storage case.

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.

Included in the unit price bid per month for the Field Office on this project will be two (2) 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 two (2) Microcomputer Systems shall consist of:

Central Processing Unit (CPU) – Lap Top

Pentium M processor, 740 (1.7 GHz) or better with integrated USB 2.0 and IEEE 1394 ports (firewire) and wireless networking included,

Minimum 1.0 GB RAM with expansion capability to at least 3.0 GB and clock/calendar card equivalent, and

Microsoft "Windows® XP Professional" operating system;

Memory (Storage)

CD/DVD +/- RW with double layer write capability, and 100GB hard drive minimum, integrated Ethernet 10/100, and internal modem. Included software shall support double layer media writing and automatic backup of data;

Monitor (Cathode Ray Tube)

Monitor for docking station and docking station - Super Video Graphics Adapter (SVGA) minimum. 19" minimum diagonal visual area flat panel with .26 dot pitch capable of multiple frequency 256 color graphics and at least 1024 pixel resolution. Swivel base with low radiation and eyestrain protection, brightness and contrast control and

Laptop - shall have 15.4" display minimum;

Color Graphics Card

Card must be SVGA AGP interface with 64 MB onboard video memory having maximum resolution of at least 1280x720 with at least 16 bit color and video control hardware and software;

Keyboard

Keyboard shall be ergonomic, enhanced layout minimum with keyboard interface cable;

Printers

LaserJet HP 2550N network capable printer or latest model with 64 MB minimum total memory having up to 600 dpi resolution and using HPL6 printer language with all necessary software and cables for proper operation; and a HP Desk Jet color printer or latest model with photo quality print capability and with all necessary software, equipment, and cables for general operation as well as connection and sharing on a local network;

Scanner

A HP6100 color scanner with HP5770 ScanJet ADF (or equivalent brand) with all necessary software, equipment, and cables for general operation as well as connection and sharing 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® XP Professional". The required applications software follows and is to be latest version unless noted:

office suite - "Microsoft® Office XP Professional",  
antivirus - "McAfee® Total Protection for Small Business",  
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,

An optical mouse with proper driving software having complete Microsoft emulation,

An internal 56/28.8/14.4 fax modem with MNP5 error checking and complete Hayes emulation having high-speed 14.4 fax capability and regular data transmission between 2400 and 56 baud, with the latest version proper driving software,

Necessary cables for proper operation,

An uninterruptible power supply (UPS) units for protection from power loss or fluctuation, minimum of 6 outlets, adequate to provide a minimum of 30 minutes backup power for an orderly shut down of the computer system with software and connections for automatic system shutdown,

24 bit Sound Blaster compatible PCI soundcard with quality desktop speakers,

A combination surge, spike, and noise protection device with receptacles for all peripherals (may be in combination with the UPS power supply),

A wrist rest suitable for use with the furnished keyboard,

Cleaning kits for disk drives,

An anti-glare filter with grounding wire suitable for use with the furnished monitor, and

All cards, hardware, and operating, anti-virus, and equipment software to be fully installed and operational;

### Maintenance and Service

Maintenance of all specified equipment and components shall be provided for by a validated service agreement for the length of the Contract. Maintenance (upgrades, replacement, full technical support) for each software application shall be provided for by validated maintenance agreement for the length of the Contract. These agreements shall allow an authorized project person to deal directly with the service organization to request repair or the maintenance organization to request assistance; and

**Supplies**

Consumables as required to manage the business of the project shall be provided for the Microcomputer Systems for the length of the Contract. These consumables shall be furnished on request and include but not be limited to compatible diskettes for provided digital cameras and memory stick media, DVDR and DVDRW media compatible supporting operational minimum to maximum speed of the DVD/RW drive unit, cut sheet paper and labels compatible with the printers, hardware and screen cleaners, and toner cartridges.

Maintenance 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 hereinabove 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 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. No separate payment will be made for costs involved for removing hazardous material or underground tanks to install these offices or the parking area.

Payment will be made only for the actual number of months that the office is acceptably provided by the Contractor.

The field office shall be ready for use not later than thirty (30) calendar days after the date of the fully executed Contract and before construction operations begin.

6/21/2012

## **763501 - CONSTRUCTION ENGINEERING**

### **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 for all excavation items.
- (c) Line and grade for extra work added on to the project plans.

### **Equipment:**

The Contractor shall use adequate equipment/instruments in a good working order. He/she shall provide written certification that the equipment/instrument has been calibrated and is within manufacturer's tolerance. The certification shall be dated a maximum of 9 months before the start of construction. The Contractor shall renew the certification a minimum of every 9 months. The equipment/instrument shall have a minimum measuring accuracy of [3mm+2ppmxD] and an angle accuracy of up to 2.0 arc seconds or 0.6 milligons. If the Contractor chooses to use GPS technology in construction stakeout, the Contractor shall provide the Engineer with a GPS rover 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. 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.

### **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:**

#### **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 check the accuracy of given control points. Establishing plan coordinates and elevations 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 0.05 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 accuracy ratio shall not exceed an error of closure of 1 foot per 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 shall 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 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, 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 advanced utility relocation, which will be performed by others, 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.

**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 and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at anytime 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.

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.
- (e) Description of newly established benchmarks with location, elevation and closed loop survey field notes.

- (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 borrow 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.

**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.

8/29/07

**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 Project Control System will be set up and maintained by the Department of Transportation to monitor and record work in progress and to coordinate and synchronize construction management functions. The Department will use Critical Path Method (CPM) scheduling to approve the Contractor's work schedule, review work progress, evaluate time extensions, identify problem areas, and recommend solutions to maintain the established work schedule. The Department will designate a Critical Path Method Administrator (CPMA) to oversee the Project Control System.

The Contractor shall designate a Critical Path Method Coordinator (CPMC) having proven experience in construction scheduling and in CPM concepts and scheduling. The CPMC shall be familiar with and have direct contact with both the Contractor's front office and field staff. The CPMC shall be knowledgeable of the status of all parts of the work throughout the length of the Contract in order to properly coordinate the Contractor's work schedule information and shall be available for consultation and preparation of documents on a daily basis. If this condition is not complied with the Contractor shall submit qualifications for a replacement CPMC to the CPMA for approval by the Engineer.

The CPMC shall submit a working drawing schedule, materials schedule, crew schedule; and shall prepare and provide the "look ahead", original, update, revised update, and final (as-built) update CPM work schedules, written CPM schedule narratives, and other CPM schedule information as required by the Project Control System Development Plan. The CPMC shall prepare and provide the Contractor's work schedule information by email as a single compressed database file in CPM format fully compatible with the Windows® version of Primavera Project Planner® used by the Engineer for generation of the CPM schedules.

The CPM format shall be the Precedence Diagram Method with days as the Planning Unit and shall be based on Calendar Days. Schedules will be developed using every day as a workday; schedules with calendars based in any manner on Working Days will not be allowed. The CPMA will receive the Contractor's CPM schedule databases for input to generate the CPM schedules. The generated CPM schedules are the Contractor's own work schedule and will be reviewed for approval by the Engineer. CPM schedules approved by the Engineer will have the word "schedule" in the center title block (layout name) of their graphic outputs and title line of their report outputs.

The scheduling of the construction is the responsibility of the Contractor; the Contractor is responsible to determine, by adequate planning, the most feasible order of work commensurate with the Contractor's abilities and the Contract Documents.

The Contractor's compliance with the Project Control System Development Plan and CPM Schedule Updates and/or Revised Updates, and the Engineer's approval of the generated Original CPM schedule, its updates and/or revised updates will be required before processing monthly estimates for payment.

It is not the intent of this Contract that the Engineer by approving the CPM schedules agrees that it is reasonable in all respects or that the schedule, if followed, will result in timely completion of the Project. The Engineer's approval is based on a review of general conformity for compliance with the requirements of the Project Control System and on the items or time restrictions that the department and/or the Engineer have control. The Contractor is free to make assumptions regarding field conditions, estimated quantities, and/or subsurface conditions. However the Department's concurrence with the Contractor's schedule based on these assumptions does not relieve the Contractor from making necessary revisions to his schedule should his assumptions fail to hold true. No time extension to the Contract which is due to assumptions made by the Contractor and that do not hold true during construction will be considered by the Department. Discrepancies and/or changes initiated by the Department in proposed quantities or plans that cause an extension to the critical path will be considered by the CPMA. The Department's controls or time restrictions are identified hereinafter and in the Standard Specifications, Special Provisions, and on the Contract Plans as plan notes.

**Development of the Project Control System (PCS):**

The PCS development plan is as follows:



- (a) Within seven (7) calendar days after the date of the fully executed Contract a workshop meeting will be held with the Engineer, CPMA, Contractor, and CPMC. The CPMA will profile the basics and procedures of the Project Control System and discuss schedule model design at this meeting. Attendance is mandatory,

The Department's partially predetermined Coding Structure (CS) format having a maximum of seventeen (17) code classification levels will be used and will be furnished at the Workshop Meeting. The CS is a specific listing that illustrates the hierarchy of work needed for the project. The hierarchy is categorized into levels or classifications. The CS classifications organize activities into manageable groups through each level of the project, for example; locations, phasing (staging), landmark dates, roadway sections and bridge structures; footings, columns, and caps; contractor and subcontractor.

The CPMC shall assist in determining the breakdown and code title descriptions from south to north and west to east of the location code classification. Activity code values shall be perspicuous for each classification grouping. Additional activity code classifications and values as required by the Engineer from time to time shall be provided and added to the schedule database by the CPMC. The CPMC shall not alter the CS and properly code all activities with the approved CS activity code values for all code classifications including all railroad, waterway, and outside agency activities with approved code values, including classifications as added by the Engineer. Coding enables generation of organized reports and graphics that can summarize any level of the project schedule.

When the Department provides a format database for the Contract, it shall be used by the Contractor as the basis from which to develop their schedule. The CPMC may add, but not insert, code classifications in the format database;

- (b) Within fourteen (14) calendar days after the workshop meeting, the CPMC:

- (1) Shall submit a working drawing schedule, using the Department's application format or other format as agreed to by the Engineer. This schedule shall also include all other items having content that requires approval to allow any portion of the work to commence or continue. This schedule shall be submitted to the CPMA for approval by the Engineer and shall contain all required working drawings and also include but not be limited to reinforcing bar lists, formwork drawings and calculations, construction procedures, borrow pit security and traffic plans, precast structures, wetland work plans, construction sequencing, load tests, and wave equation analyses. Working drawing information shall include the identification number, description, type, anticipated submittal date, time frame for preparation and review, approval needed by date, and a resubmittal process (if expected) for each listed item. This information shall also give factory leadtime and expected delivery date, if applicable, for each listed item.

The Contractor should be aware that the Department's time frame for review of working drawings and other submittals properly submitted or resubmitted in accordance with Standard Specification Subsection 105.04 will be thirty (30) calendar days duration unless mutually agreed to by the CPMC and CPMA; this 30 day duration supercedes the time frame of the Subsection. If a working drawing or other submittal involves review by railroads, environmental agencies, municipalities, other states, federal agencies, or the U. S. Coast Guard the time frame for review will be sixty (60) calendar days unless mutually agreed to by the CPMC and CPMA. The time frame will begin on the date of receipt of the drawings by the reviewer and will end on the date of transmittal returning the drawings to the Contractor by the Department. No drawings will be accepted for review until an initial working drawing schedule has been accepted unless agreed to by the Engineer.

The working drawing schedule shall be updated and correlated with the activities of the "look ahead" and all other CPM schedules;

- (2) Shall submit a materials schedule using the Department's application format or other format as agreed to by the Engineer. This schedule shall be submitted to the CPMA for approval by the Engineer and shall contain all required materials, samples, and sources

of supply. The materials schedule information shall include the identification number, description, generic or brand name, sample requirement, and manufacturer's and supplier's name, address, and phone number for each listed item. The schedule shall also give the anticipated submittal date, time frame for preparation and review, approval needed by date, factory leadtime, and expected delivery date, if applicable, for each listed item.

The materials schedule shall be updated and for materials having long factory leadtimes shall be correlated with the activities of the "look ahead" and all other CPM schedules;

- (3) Shall submit a crew schedule. This schedule shall be submitted to the CPMA for approval by the Engineer and shall be accompanied by a written narrative and shall contain all crews and their work plan.

The crew schedule shall be updated and correlated with the activities of the "look ahead" and all other CPM schedules;

- (4) Shall prepare and provide a written narrative of the Contractor's work plan and an acceptable "look ahead" schedule database in CPM format. This schedule database shall reflect activities for the Contractor's overall work plan for the entire project detailing the "look ahead" period and shall be submitted to the CPMA for acceptance by the Engineer. The "look ahead" period shall be as determined by the Engineer. The "look ahead" schedule shall be maintained and updated until an Original CPM schedule is approved. The "look ahead" schedule shall also reflect the Sequence of Construction in the plans unless otherwise approved by the Engineer. This "look ahead" schedule, its updates and/or revised updates shall also be incorporated into the Original CPM schedule database. Issue of the Notice to Proceed is contingent upon receipt and acceptance of this schedule in accordance with Standard Specification Subsections 108.02 and 108.03; and

- (5) Shall begin meeting with the CPMA at their office every third business day to prepare and provide a written narrative of the Contractor's work plan and a CPM schedule database until a useable, logical draft of the full CPM schedule network, responsive to the project requirements and correlated with the required schedules has been developed as determined by the Engineer. The CPMA will generate an initial CPM schedule from the CPMC's logical draft CPM schedule database for review by the Engineer. This initial schedule shall reflect the Sequence of Construction in the plans unless otherwise approved by the Engineer. This initial CPM schedule database, if acceptable, may be used to fulfill the Contractor's "look ahead" schedule requirements;

- (c) If the initial CPM schedule is not acceptable to the Engineer, the CPMC shall continue to meet with the CPMA on every third business day and prepare and provide the Contractor's written narrative and CPM schedule database as necessary until a generated CPM schedule is acceptable to the Engineer; and

- (d) Within twenty-eight (28) calendar days after the workshop meeting, an initial CPM schedule must be generated having the requirements for the Engineer's approval. This schedule shall reflect a clear understanding of the Contractor's work plan, be adequate to determine the Department's staffing requirements, have correct physical logic, incorporate construction and traffic phases, and display clarity of presentation for review and processing. Upon approval the CPMA will furnish the Contractor a graphic and report output of this CPM schedule. This CPM schedule, or Original CPM schedule, is the Contractor's own work schedule and the Contractor's responsibility to maintain.

The ending (cut-off) day for each monthly estimate period shall be proposed by the Contractor subject to Department approval. In the event of a conflict, the Engineer will have the authority to establish the ending day.

Processing of monthly estimates for payment will begin or continue only if the Contractor is in compliance as determined by the Engineer with the PCS Development Plan.

Any information required by the Engineer for analysis of the CPM schedules, their updates and/or revised updates; clarification of charts and other schedules; and evaluation of proposed changes or change orders shall be prepared and provided by the CPMC. A copy of the current approved CPM schedule, its updates and/or revised updates shall be on display at the field office of both the Department and the Contractor.

**CPM schedule information and requirements:**

The CPMC shall prepare and provide the Contractor's work schedule information in the form of work step and restraint activities:

- (a) Work step activities are single step construction elements,
- (b) Restraint activities are not construction elements but affect the start of other activities.

When setting forth work steps and restraints the breakdown on these activities shall address the following factors:

Work Step factors affecting the duration and/or sequence of activities;

- 1. Work at locations done at different times or requiring different crews,
- 2. Work requiring different materials,
- 3. Work requiring different crew or craft requirements,
- 4. Work requiring different equipment,
- 5. Work requiring different responsibility (subcontractors),
- 6. Structural work having distinct subdivisions,
- 7. Labor and equipment resource availability,
- 8. Work as reflected in the Contractor's estimating or accounting breakdown,
- 9. Work as reflected in the state's breakdown for bidding or payment,
- 10. Public, private, and/or Contractor utility work and limiting or outage schedules of public and/or private utility organizations, and
- 11. Maintenance of traffic.

Restraint factors affecting the start of other activities;

- 1. Preparation of working drawing and materials submittals,
- 2. Approval, return, and/or resubmittal of working drawings and materials,
- 3. Specialized material testing,
- 4. Long lead purchases - material and equipment availability,
- 5. Material and equipment fabrication time,
- 6. Testing of special equipment and in place testing,
- 7. Delivery of unusual shipment or scarce material,
- 8. Dependency on completion of utility work,
- 9. Dependency on the Department's approval of issues involving public, private, and/or other governmental agencies,
- 10. Dependency on completion of part or all of another Department contract or construction of other organizations, whether contiguous or not,
- 11. Protection and restoration of property, forest protection, special traffic controls, erosion control and water pollution, environmental controls and suspensions, safety, and foreseeable archeological and/or historical evidence delays,
- 12. Procurement of permits, and
- 13. Conditions as set forth in Standard Specification Subsection 107.01.

Activities must be identified by a name, symbol, and coding, and shall have duration, sequence, responsibility, and resources.

Activity names or titles shall be descriptive and be single identifiable work steps or restraints. A sample breakdown list of activity titles may be furnished to the Contractor by the Engineer on request. Activities shall be selected, as a minimum, on a structure by structure and/or section by section basis where relevant and have further breakdown into secondary components. Activities shall be inclusive and representative of the Contract work. Activity symbols, or ID's, shall be unique and systematic.

Activity codes shall have classifications and values. The approved CS will determine activity code classifications and values. The CPMC shall identify activities using these classifications and code values. Additional activity codes as required by the Engineer shall be provided by the CPMC.

Activity durations, or Original Durations, shall be reasonable and representative of the scope of the activity. If durations are considered excessive or insufficient, the industry standard will be used. Original Durations may not exceed thirty (30) calendar days unless approved by the Engineer. Durations of activities shall be determined by using productivity rates based on calendar days, not work days. Original Durations of activities may not be less than two (2) calendar days unless agreed to by the CPMA. The use of calendar day productivity rates in CPM scheduling allows for customary days during the work week that the Contractor does not work and for normal weather delays. Productivity rates used to establish durations shall reflect the time periods when work can be scheduled and exclude the non-work period of the activity's calendar. Activity calendars allow activities to be scheduled only when allowed by the nature of or restraints on the work. Calendars shall not exclude weekends, holidays, or other times the Contractor does not work.

All activities shall be identified by entry of their appropriate Calendar. A minimum of fourteen (14) shall be used and the first fourteen (14) shall be ordered and entitled as follows: 1) Full schedule, 2) Environmental, 3) Winter Condition, 4) Concrete Work, 5) Concrete Work Winter, 6) Concrete Deck, 7) Concrete Paving, 8) GABC, 9) Asphalt Base, and 10) Asphalt Surface, 11) SMA, 12) Night Paving Asphalt Base, 13) Night Paving Asphalt Surface, 14) Night Paving SMA. Calendar non-work periods shall reflect the average Delaware weather history of and the environmental regulations for the location of the Contract work. The Contractor may perform work during its calendar non-work period when favorable weather allows the work to be performed without compromising its specification and at no cost to the Department. When the Department provides a format database from which to develop the CPM schedule, the Contractor shall not modify the Calendars in the format database unless approved by the Engineer. The non-work periods of the calendars follow:

CALENDAR	NON-WORK PERIOD
1) Full schedule,	N/A
2) Environmental:	Varies; project specific,
3) Winter Condition:	December 1 thru March 15,
4) Concrete Work:	December 1 thru March 15,
5) Concrete Work Winter:	N/A (Protection provided at no cost to the Department)
6) Concrete Deck:	November 15 thru March 31,
7) Concrete Paving:	December 1 thru March 15,
8) GABC:	November 15 thru March 15,
9) Asphalt Base:	November 15 thru March 15,
10) Asphalt Surface:	November 15 thru March 15,
11) SMA	November 15 thru March 31,
12) Night Paving Asphalt Base:	October 15 thru April 30,
13) Night Paving Asphalt Surface:	October 15 thru April 30, and
14) Night Paving SMA:	October 15 thru April 30.

Activity durations are based on Calendar Days and shall reflect all time necessary to complete an activities work and its requisites. The Contractor shall include in their original schedule narrative their work day to calendar day conversion factors with a discussion of how these factors were determined. When scheduling using multiple resources each resource unit shall have a corresponding activity. All time to complete the activity shall include as a minimum all Contractor unscheduled work days, all Contractor holidays, and allowance for normal weather delays, except for software generated calendars. Inclement weather and failure of a contractor and their subcontractors to provide sufficient resources are not means to recover costs or time due to delay.

Activity sequence shall be typical of proficient scheduling practice. The sequence must be logical and representative of the Contractor's order of the work. Successors and predecessors determine the job logic or activity sequence. Successors are activities that follow an activity. Predecessors are activities that precede an activity. A given activity cannot start until all predecessors have been completed. The Precedence Diagram Method (PDM) shall be used. The PDM places the activities on nodes and the dependencies between them are defined by arrows. Only finish to start dependency relationships (links) shall be used; lag times may not be used unless approved by the CPMA. The Department reserves the right to request a resequencing of activities to effect competent scheduling practice and realistic job logic.

Activities shall be sequenced to reflect resource apportionment. When one crew (resource) is being utilized to perform all of many similar activities, these activities must be linked together in some sequence to reflect that one crew is performing the work. Additionally, when several crews are performing similar activities, these activities must have separate linked sequences equal to the number of crews performing the work. Activities shall be logically connected and coded to reflect the crew (resource) performing the operation. A summary list of crews, their crew codes, and their operation(s) shall be included with each schedule submission unless unchanged. Resource loading will not be required unless otherwise directed by the Engineer. If resource loading is directed, payment will be incidental to the Item "763509 – CPM Schedule Updates and/or Revised Updates".

Activity responsibility shall be identified for each activity except those performed by the Contractor, if requested by the Engineer. Subcontractors, DBE's, utilities, performers of other contracts, and performers of adjoining work on other advertised contracts shall be identified by coding when responsibility for an activity is requested.

Activity resource loading shall be required only if the Contractor demonstrates the inability to maintain the CPM schedule. In this event, the Engineer shall have the authority to require resource information for all activities affecting project completion. Resource information includes manpower, equipment, materials, and/or services and has cost and has a range and amount of availability. Lack of sufficient resources will not be considered cause to extend durations when preparing the CPM schedule. By bidding to contract the work, the Contractor has ensured that sufficient resources are available or will be available in a suitable time frame to perform the work within the Contract Time, even if a resequencing of activities requires an activity or activities to shorten their Remaining Duration. In the event the Contractor demonstrates the inability to maintain the CPM schedule, the Engineer may require the Contractor to increase the number of shifts, begin overtime operations, work extra days including weekends and holidays, supplement construction plant and equipment, or all or any of the foregoing as a step to improve the Contractor's work progress all without additional cost to the Department.

Work activities shall as a minimum be representative of all construction work for each operation, each phase (stage), and each location.

Working drawings shall be included as activities. Preparation and leadtime (order, manufacture, and delivery time), shall be included as activities for each applicable working drawing item. A separate activity shall be used to begin the submittals of working drawings. Time extension(s) will not be considered when submittal activity(s) affects the critical path except for owner caused delay as recognized by the Engineer. If working drawings require resubmittal(s), activities for their preparation and activities for their approval (having the Department's review time) shall be included in the next CPM schedule update database. Time extension will not be considered when resubmittal activity(s) affects the critical path except for owner caused delay as recognized by the Engineer. Working drawing activities and leadtime activities not requiring submittal shall not be on the critical path of the Original CPM schedule.

Materials having long leadtime and/or manufacture time or that are difficult to acquire and/or fabricate shall have materials approval and leadtime activities included in the schedule for each applicable material item. A separate activity shall be used to begin the submittal of these materials. These material approval and leadtime activities shall not be on the critical path of the Original CPM schedule.

Administrative milestones shall be included as activities. Each milestone of the bidding through first chargeable day process shall be an activity.

Utility work shall be included as activities and shall be identified accordingly. Each utility item on the plans or listed in the Contract's Utility Statement shall be an activity. The activity description shall indicate the utility company and include the number of each listed item or be numbered according to the item's order in the Utility Statement. A separate activity shall be used to begin utility work. Utility activities shall not be impactive on the Original CPM schedule unless authorized by the Engineer.

Agency agreements and/or arrangements and other submittals for approval shall be included as activities. A separate activity shall be used to begin the agency items and other submittals for approval.

The effect of other Department contracts or construction of other organizations on the completion of part or all of this Contract shall be included as activities. A separate activity shall be used to begin these items.

Phasing (staging) shall be included as activities. These activities shall be correlated with the sequence or suggested sequence of construction on the plans and/or in the specifications. A separate start and finish milestone activity shall be used to start and to complete each phase.

When multiple crews are performing an operation or a string of operations, each crew shall be logical connected and coded to reflect the crew performing the operation.

Surcharge durations and special testing, if applicable, shall also be included as activities. Sufficient duration times for these activities will be allowed as per the plans and specifications or as agreed to by the Engineer.

Activity types must be either "task", "start milestone", or finish milestone. "Hammock" type activities may be allowed as agreed to by the Engineer. If the Department requires resource loading, "task" activities may be converted to "independent" type as agreed to by the Engineer.

Date constraints, float and duration constraints, and/or flags for activities will not be allowed. Milestones that do not constrain the schedule shall be allowed as agreed to by the Engineer when unique or unusual events cause a restraint to the Contractor's work schedule. The use of "Start No Earlier Than" (SNET) and "Zero Free Float" (ZFF) constraints for activities may be allowed for the purpose of schedule clarity or definitude if acceptable to the CPMA.

Total Float is defined as the difference between the current schedule finish date and the Contract Completion Date that is entered by constraint ("Project must finish by:" date) in the schedule.

Free float is defined as the amount of time between when an activity "can finish" (the early finish) and when an activity "must finish" (the late finish). Free float is float shared with all other activities and is defined as the amount of time an activity can be delayed without affecting the critical path of the schedule. It shall be understood by the Contractor and the Department that free float is a shared commodity, not for the exclusive use or financial benefit of either party. Either party has the full use of the free float until it is depleted.

The critical path is defined as the series of activities in a CPM schedule network that has the longest path in time. The submitted activity sequence and durations must generate a CPM schedule having only one (1) critical path; a schedule with multiple or near multiple critical paths will not be allowed. Work like project wide Maintenance of Traffic, Construction Engineering, or Temporary Erosion Control that by their nature are ongoing for long durations or the duration of the project and are basically complementary to other activities, shall be divided and condensed into "establish" and "conclude" activities to prevent this type of work from being the major portion of the critical path or its entirety.

The Project Start Date, or initial Data Date, of the Original CPM schedule shall be the first chargeable day of work. The first schedule activity related to productive work shall be entitled "First Chargeable Day" and shall be a start milestone. Nonproductive work and administrative activities may begin and/or end prior to the Project Start Date and shall be stated as such in the Original CPM Schedule. The submitted activity sequence and durations must generate an Original CPM schedule using all the Contract Time and a critical path having zero total float. An early completion schedule will not be allowed. The Contractor's original schedule shall reflect the use of the entire Contract Time. The schedule ending date that uses all the Contract Time in the Original CPM schedule will be the original Contract Completion Date. This Contract Completion Date shall be fixed (Project must finish by:) in the Original CPM schedule and shall remain unchanged unless a time extension is awarded.

The Contractor's Original CPM schedule shall allocate the work over the entire Contract Time. The Contractor shall not anticipate early completion in bid preparation and shall distribute all time-driven and/or time-dependent costs uniformly over every day of the Contract Time when preparing the bid. No early completion schedules will be accepted.

After the Original CPM schedule utilizing all the allocated Contract Time has been approved, job conditions or logic changes may occur which require revision to the schedule. Only an update may be revised. These revised updates must be reflective of the Contractor's actual intent in constructing the project. The revision may cause the project completion date to be earlier than the completion date of the current approved schedule. This is acceptable to the Department; but no claims will be considered for time-driven and/or time-dependent costs (such as delay and/or extended overhead expense) which are a result of not meeting this new project "early finish" date. Consideration for these costs would occur only for approved extensions that force actual project completion past the originally advertised Contract Time including authorized time extension(s). However, no credits for non-

expended overhead will be requested should a Contractor successfully achieve completion of the project prior to the use of all the Contract Time.

If the project is delayed, the contractor must demonstrate the inability to perform other critical or near critical work to receive consideration for an extension of Contract Time.

CPM schedule databases shall be calculated using the relevant Data Date prior to submittal to the CPMA. The Data Date of CPM schedule updates and revised updates shall be the next day after the end of the update period. Schedule calculations of CPM databases shall be based on retained logic, contiguous durations, and total float as finish float.

Activity Log (memo) information is allowed, but must be factual; shall be removed, if redundant; and shall not be masked, but indicated for printing to output reports. Punctuation is not required for activity and Activity Log information unless necessary for clarity.

Statusing or contract progress of activities for updates is the entering of Actual Start dates, Suspend Date(s), Resume Date(s), Actual Finish dates, and changes in Remaining Durations to the database. An activity's Original Duration may not be changed. An activity that begins (has an Actual Start Date) must have its Remaining Duration reduced by at least 1 day.

Activity Suspend and/or Resume Dates shall be added to the activity record and the factual reasons for the cause shall be added to the respective activity Log. If an activity is suspended again it shall be curtailed and assigned an Actual Finish Date equal to the latest suspension date, and a new activity (portion 2) comprising the balance of remaining duration shall be created and inserted in succession; both activities shall indicate by log comment the facts causing this condition.

Log statusing shall be used when an activity has out-of-sequence progress and no Actual Finish Date. Out-of-sequence progress occurs when any previous predecessor of an activity has no Actual Finish date. Log statusing is the entering of the Actual Start date to the Activity Log of the database in the Departments format. These entries are not to be masked, but indicated for printing to output reports. Changes in Remaining Durations shall be entered to the database but not the Activity Log. When progress is no longer out-of-sequence or all previous predecessors of the activity have Actual Finish dates, the activity's Actual Start shall be taken out of log status and entered to the database. Log statusing provides schedule output that prevents graphic distortion of schedule activities and preserves the design sequence of the CPM schedule plan. The Engineer shall have the authority to require a revision of the CPM schedule because of out-of-sequence progress. A suspended activity that requires log statusing shall be treated in the same manner as though it was suspended again.

Each original, update, and revised update schedule database and subsequent draft submitted for approval shall have a unique and manifest Project Name and shall be uniquely identified by entry (Number/Version) in the schedule database.

Corrections are defined as entries to the database that rectify coding and activity identification errors. Corrections shall be identified by written narrative and/or as agreed to by the CPMA. Exception(s) taken in PCS or other Department correspondence shall be complied with in the subsequent update and/or a revised update of the CPM schedule.

Written narratives shall be included with each submission of initial or revised update databases. The narratives must conceptualize work plans, modifications, and/or corrections but may be summary unless otherwise directed by the Engineer. These narratives shall describe where and the crews and order of what is to be done; narratives that are a listing of the work will not be acceptable. The Department will only accept schedule databases that reflect the work plans, modifications, and/or corrections reflected by their respective written narratives.

Inaccurate and/or faulty databases of any CPM schedule update and/or revised update will be unacceptable and shall be summarily corrected and resubmitted. Resubmittals shall be labeled "2nd Draft", "3rd Draft", etc. as appropriate and identified by entry (Number/Version) in the schedule database.

Any activity(s) or activity information that is necessary to generate a CPM schedule acceptable to the Engineer and/or schedule information that is requested by the Engineer shall be prepared and provided by the CPMC.

The CPMA will generate the CPM schedule network reflecting the Contractor's scheduling information. Upon approval of the Original CPM schedule and subsequent CPM schedule updates and/or revised updates, the CPMA will furnish the Contractor graphic and report outputs of these schedules. These CPM schedules are the Contractor's own work schedule and the Contractor's responsibility to maintain.

**Monthly CPM Schedule Updates:**

The CPMC shall meet with the Contractor and Resident Engineer and prepare the required work schedule progress information (status reports) to update the CPM schedule. This information shall be submitted on status forms provided by the Department that are generated from the Original Schedule and thereafter from the previous CPM schedule update or revised update(s). This update information shall reflect the current state of completed project work. The update information shall include all activities on which work was performed and/or there was progress during the update period and shall include as a minimum their actual start dates, suspend dates, and resume dates; and the estimated remaining durations or actual finish dates. The update information shall be as agreed to and signed-off and dated by the Resident Engineer and the CPMC. The CPMC shall use the signed-off and dated information to status and/or log status the update database.

The Contractor shall submit the CPM schedule database update and a copy of the signed off update information within five (5) calendar days after the end of each monthly update period. The database and signed off information must match. The CPMA will generate a CPM schedule update reflecting the Contractor's update information. The five (5) calendar day submittal period will enable the Department to discuss current schedule information at the monthly progress meeting held the following week.

If the critical path of the generated CPM schedule update has less than minus ten (-10) calendar days of total float the CPM schedule update shall be revised.

Upon approval of the CPM schedule update, the CPMA will furnish the Contractor a graphic and report output of this update. This CPM schedule update is the Contractor's own updated work schedule and the Contractor's responsibility to maintain.

**CPM Schedule Revised Updates:**

The CPM schedule shall be revised if the critical path has less than minus ten (-10) calendar days of total float, conditions require the Contractor to modify the work schedule, the Contractor chooses to make a significant change in the sequence of work, or the Department requests the schedule to reflect the current state of the work and/or the Contractor's acknowledged work plans. The revised update shall reflect the Contractor's current order of work and include new and/or previous activities affected by the change and shall include a written narrative of these changes. Revision as required by this Specification or as requested by the Department does not constitute acceleration unless agreed to by the Engineer. Revisions shall be identified as the revised update of the current approved CPM schedule update. Revisions are to be singular in modification and not lumped together in the same revised update unless otherwise directed by the Engineer. Additional revision(s) of the same update is therefore acceptable. The Department reserves the right to request a resequencing of activities to effect a completion date within the Project Time.

The CPMC shall meet as needed with the CPMA at the Engineer's office within five (5) calendar days after revision is required, formal request for a revision, or the Contractor announces intent to submit a revision. The purpose of the meetings shall be to prepare the Contractor's revised update CPM schedule database and its written narrative of changes. These meetings shall continue until a useable, logical draft of the revised update CPM schedule network, responsive to the modification requirements, has been developed that will generate a workable, CPM schedule revised update having a completion date using or within the Contract Time or that allowable by this specification. The submitted CPM schedule database revised update must reflect its written narrative. Revised updates inconsistent with their written narratives will not be acceptable. The CPMA will generate the CPM schedule revised update reflecting the Contractor's new information. The reports generated by the CPM schedule revised update shall be used to prepare the update information for the next CPM schedule update.

Reduction of activity durations will not be considered acceptable criteria for revision to bring the project back on schedule unless activity quantities have been reduced or the Contractor provides a narrative describing how their means and methods to construct the work shall change and/or their resource allocation to perform the work shall increase.



For activities using like resources, modification of activity relationships to be concurrent (run parallel) with each other will not be considered acceptable criteria for revision to bring the project back on schedule unless the Contractor provides a narrative describing how their crews and/or resource allocation to perform the work shall increase.

A CPM revised update having the requirements for the Engineer's approval must be completed before preparation of the next CPM schedule update. Processing of the next monthly estimate for payment will begin only after the Engineer's approval of the signed CPM schedule revised update.

Upon approval of the CPM schedule revised update, the CPMA will furnish the Contractor a graphic and report output of this revised update. This CPM schedule revision is the Contractor's own revised work schedule and the Contractor's responsibility to maintain.

In the event that the Contractor fails to maintain his CPM schedule in a satisfactory manner, the Engineer reserves the right to enforce the provisions as set forth in Standard Specification Subsection 108.10.

#### **Change Orders and adjustment of completion time:**

A Change Order will only be considered for extension of Contract Time when the modified critical path shows requirement of additional time because of the added activity or activities and/or there is justifiable delay as recognized and determined by the Engineer. For any change order that affects the schedule, the Department reserves the right to request a resequencing of activities to effect a completion date within the Project Time.

If the CPM schedule has been updated and/or revised and positive total float has been created, no additional time will be given for added activity(s) unless the modified critical path shows requirement of additional time and/or there is justifiable delay as recognized and determined by the Engineer. Compensation for additional overhead costs will not be considered until all of the original Contract Time has been utilized. The Engineer reserves the right to "bank" (postpone the award of) approved time extensions if the project is ahead of schedule.

If a change order represents issues for which the effect on contract time can be readily determined, then any time adjustment will be agreed upon by the CPMC and CPMA prior to final execution of the change order. Determination of time adjustment will be based on the effect of the issue on the CPM schedule, the current approved CPM schedule update or approved CPM revised update, and the Department's Time Evaluation Worksheet (TEW) submitted by the Contractor.

However, if the issues represented by the change order require further analysis and review in order to accurately and fairly evaluate the effect on contract time, then the change order contract time assessment block may be marked "not considered at this time". This will be done in order to not delay payment to the contractor for completed work included on a particular change order while the time analysis is being performed. In these cases, final resolution of any time related issues would be made as soon as all required information is received and analyzed by the Department and the Contractor.

After signature by all parties, the change order is considered approved, and work activities and any time modifications as shown on the approved TEW that affect the CPM schedule shall be reflected in the next CPM schedule update or revised update and be documented by written narrative. Only activities on the approved TEW may be included as activity(s) in schedule databases. Updates reflecting change order(s) that are inconsistent with their change order narratives will not be acceptable. No change orders will be processed until their effect on the CPM schedule has been determined, unless otherwise approved by the Engineer. A change order may not be included in a monthly estimate for payment unless approved by the Department on or before the cutoff date of the estimate. All official time extensions will be granted by letters from the applicable District Construction Engineer or his/her designated representative.

Issues involving potential time extensions must be addressed in the CPM schedule update period in which they occur or they cannot be considered. If the Contractor proposes a change to the Contract work, any time the Contractor spends in discussion and preparation, and any time the Department requires for review in the approval or disapproval process for this proposed change to the Contract work will not be considered for granting of additional contract time. It is the obligation of the Contractor to complete the project on time according to the original contract documents including current approved changes notwithstanding any change submitted for approval that may or not be accepted. The Contractor is obligated to prosecute the work at any time according to the Contract Documents in covenant at that time.

If an allowance for weather days has been included in the Completion Date section at the beginning of the Contract Special Provisions, these days shall be identified as Contract Weather Days. The following definitions regarding weather days will be utilized:

Weather day – Any Calendar Day (including weekends and Holidays) on which a weather event prohibits contract work on critical path activities. Events include, but are not limited to rain, snow, or extreme temperatures.

Lost day – Any Calendar Day (including weekends and Holidays) on which residual effects from a weather event prohibit contract work on critical path activities. Examples include, but are not limited to, wet conditions from a previous rain event, snow cover, or frozen ground.

Extensions of Contract Time for weather will not be considered until the total of weather days and lost days as defined above exceed the number of Contract Weather Days as listed in the Completion Date section at the beginning of the Contract Special Provisions. The Contractor and the Department will record and agree on weather days and lost days. A day will be considered a weather or lost day if it prevents progress of the current or next work activity on the critical path of the schedule, unless it occurs during a calendar non-work period of the current or next work activity on the critical path of the schedule in which case the day will not be counted as a weather day. Weekends and holidays will also be excluded from consideration for weather and lost days during calendar non-work periods.

When the total of weather days and lost days recorded in the field exceed the advertised Contract Weather Days, the Contractor will be awarded a day for each day weather or conditions due to previous weather events prevent progress of the current or next work activity on the critical path of the schedule. When weather affects an activity not on the critical path and the activity becomes the critical path, the allowable days of time extension will be only for the days the activity was on the critical path. The Contractor and the Department will record and agree on these weather days. Inability to prosecute work not shown as activities in progress on the most recent CPM schedule will not be considered when determining an extension of Contract Time. The Engineer will have the final decision as to the number of calendar days the Contractor's work was limited to because of weather.

#### **Final (As Built) CPM Schedule Update:**

The CPMC shall meet with the Contractor and Resident Engineer and prepare the required as-built work schedule information and corrective work schedule information to finalize the CPM schedule. The progress reports generated by the previous CPM schedule update or revised update will be used to prepare this update information. This final update information shall reflect the final state of the project work. The final update information shall include all activities on which work was performed and/or corrections since the last update period and shall include as a minimum the activity ID and title, the actual start and finish dates, and the actual completion date. The final update information shall also include any revisions and change orders not previously included in the CPM schedule. These correction, revision, and change order modifications shall be reflected by a final update written narrative. The final update information will be as agreed to and signed off by the Resident Engineer and the CPMC. The CPMC will use the signed off information to status the CPM schedule database to prepare the final update schedule.

The Contractor shall submit the final CPM schedule database and a copy of the signed off final update information within five (5) calendar days after formal request for this update. The database and signed off information must match. The CPMA will generate a final CPM schedule update reflecting the Contractor's new information. Upon approval of the final CPM schedule update, the CPMA will furnish the Contractor graphic and report outputs of this final update.

The CPMC shall submit two (2) signed copies of the final CPM schedule update to the CPMA. Processing of the final estimate for payment will begin only after these signed copies are received. This final (as built) CPM schedule is the Contractor's final work schedule.

#### **Method of Measurement:**

The Project Control System will be portioned into two (2) items. The item, "Project Control System Development Plan", will be bid price lump sum. The item, "CPM Schedule Updates and/or Revised Updates", will be unit bid price per each approved update.

#### **Basis of Payment:**

The item, "763508 - Project Control System Development Plan", will be paid for at the Contract lump sum bid price, on the next monthly estimate after completion of the requirements of the Project Control System Development Plan, which includes approval of the Original CPM schedule.

The item, "763509 - CPM Schedule Updates and/or Revised Updates", will be paid for at the Contract unit bid price per each approved CPM schedule update. Revised updates are incidental to this item, except that each revised update(s) requested by the Department for purposes of incorporating Plan Revisions will be paid as one (1) approved CPM schedule update.

10/28/2010

**763522 - COAST GUARD SPECIFIC CONDITIONS**

**Description:**

The Contractor shall prosecute his work in accordance with the specific requirements imposed by this Special Provision.

Under this item the contractor will be required to:

1. Prepare and furnish three copies of a plan and schedule for his operations within the waterway, for submission to Commander (AOWB), 5th Coast Guard District, 431 Crawford St., Portsmouth, VA 23704 for approval. The Contractor shall comply with all provisions of the Inland Rules of the Road. The Contractor shall give written notice to the Coast Guard of any planned temporary obstruction to the waterway navigation as well as copies of the plan and schedule of operations at least 30 days in advance of commencement of the work.

The plan and schedule of operations within the waterway shall include:

- (a) A sketch of the waterway indicating:
  - (1) Locations of all restrictions that will be placed in the waterway, such as barges, anchors and anchor lines.
  - (2) The location and height above high mean water of any scaffolding or netting.
- (b) A projected set of dates and length of time each operation will take, hours of each operation and whether or not the equipment will be removed at night.
2. Give immediate notice to the Coast Guard and to the Department, of any material, machinery or equipment lost, dumped, thrown overboard, sunk or misplaced during the progress of the work. The Contractor must remove the object with utmost dispatch. Until removal can be affected, the object or objects shall be properly marked in order to protect navigation. Notices to the Coast Guard and to the Department shall give a description and location of any such object and the action taken or being taken to protect navigation.
3. Furnish and install temporary obstruction lights as may be required by his operation and his permanent construction under this contract. Each temporary light shall consist of battery or power operated slow flashing amber light less than 60 flashes per minutes and visible for a range of 4 nautical miles on 90% of the nights of the year. Generally a lamp of 20 candle power will meet these requirements. If necessary to obtain the coverage required, a light or lights on the upstream and downstream sides shall be installed. Bridge piers shall be so marked until the construction has been completed and permanent navigational lights have been installed and determined to be operating satisfactorily. Four copies of Plans showing the proposed temporary lights during construction shall be submitted to the Department for approval before work is commenced. Deviations from the prescribed temporary lights during periods of construction will be permitted only upon written Coast Guard approval.

In the event the Contractor fails to comply with these foregoing requirements and the Federal Government is required to take action in this matter for the protection of navigation, the Department reserves the right to recover costs for such work from the Contractor.

The Federal Government and the Department assume no responsibility for any damage sustained or caused by the Contractor's plant, equipment or barges being anchored or moored at the aforementioned location and approval by either agency shall not act as a waiver of liability for any damage that may result from the Contractor's operation.

The Contractor shall maintain the temporary obstruction lights on permanent construction until permanent navigational lights have been installed and made operable in accordance with the Coast Guard requirements.

**Basis of Payment:**

All work and the Contractor's costs in every respect for compliance with the specific conditions imposed by the Coast Guard Commandant and specific under this item, together with the maintenance and removal of the temporary obstruction lights, installing of permanent navigational lights, and all else in connection therewith and incidental thereto which is not provided for under any stipulated pay item "Coast Guard Specific Conditions", which price and payment shall constitute full compensation for furnishing and installing all materials as described herein.

11/2/06

**763643 - MAINTENANCE OF TRAFFIC – ALL INCLUSIVE**

**Description:**

This item shall consist of furnishing, installing, maintaining and/or relocating the necessary temporary traffic control devices used to maintain vehicular, bicycle and pedestrian traffic, including persons with disabilities in accordance with the Americans with Disabilities Act, as amended. All work shall be performed in a manner that will provide reasonably safe passage with the least practicable obstruction to all users, including vehicular, bicycle and pedestrian traffic.

All requirements of the Delaware Manual on Uniform Traffic Control Devices (MUTCD), Part 6, herein referred to as the Delaware MUTCD. (latest edition with all revisions made up to the date of Advertisement of this project) shall apply for all temporary traffic control devices. Any, and all, control, direction, management and maintenance of traffic shall be performed in accordance with the requirements of the Delaware MUTCD, notes on the Plans, this specification, and as directed by the Engineer.

The Contractor shall be aware that the Case Diagrams and safety measures outlined in the Delaware MUTCD are for common construction situations and modifications may be warranted based on the complexity of the job. The Contractor shall submit justification for modifications to the Temporary Traffic Control Plan (TTCP) to the Engineer for approval prior to implementation.

The Department reserves the right to impose additional restrictions, as needed, for the operational movement and safety of the traveling public. The Department reserves the right to suspend the Contractor's operations until compliance with the Engineer's directive for remedial action, based on but not limited to the following reasons:

1. The Contractor's operations are not in compliance with the Delaware MUTCD, the specifications or the Plans.
2. The Contractor's operations have been deemed unsafe by the Traffic Safety Engineer or District Safety Officer.

**Materials and Construction Methods:**

The Contractor shall submit a Temporary Traffic Control Plan (TTCP) or a Letter of Intent to use the Plan recommended Delaware MUTCD Case Diagram(s) at or prior to the pre-construction meeting. The Contractor shall submit the TTCP for all Contractor and subcontractor work to be performed on the project for the Department's approval before the start of work.

When specified by a note in the Plans, the Contractor shall be required to have an American Traffic Safety Services Association (ATSSA) certified Traffic Control Supervisor on the project. The authorized designee must be assigned adequate authority, by the Contractor, to ensure compliance with the requirements of the Delaware MUTCD and provide remedial action when deemed necessary by the Traffic Safety Engineer or the District Safety Officer. The ATSSA certified Traffic Control Supervisor's sole responsibility shall be the maintenance of traffic throughout the project. This responsibility shall include, but is not limited to, the installation, operations, maintenance and service of temporary traffic control devices. Also required is the daily maintenance of a log to record maintenance of traffic activities, i.e., number and location of temporary traffic control devices; and times of installation, changes and repairs to temporary traffic control devices. The ATSSA Traffic Control Supervisor shall serve as the liaison with the Engineer concerning the Contractor's maintenance of traffic. The name, contact number and certification for the designated Traffic Control Supervisor shall be submitted at or prior to the pre-construction meeting. The cost of the ATSSA certified Traffic Control Supervisor shall be incidental to this item.

Temporary traffic control devices shall be maintained in good condition in accordance with the brochure entitled "Quality Guidelines for Temporary Traffic Control Devices", published by the American Traffic Safety Services Association (ATSSA). Any temporary traffic control devices that do not meet the quality guidelines shall be removed and replaced with acceptable devices. Failure to comply will result in work stoppage with time charges continuing to be assessed.

Any existing signs that conflict with any temporary or permanent construction signs shall be covered as needed or as directed by the Engineer. The cost for temporarily covering conflicting signs shall be incidental to this item.

Access to all transit stops located within the project limits shall be maintained unless otherwise directed by the Plans or the Engineer. Maintaining access shall include maintaining an area for the transit vehicle and also an accessible path for pedestrians to safely access the transit stop.

The Contractor shall notify the Engineer, in writing, no less than fourteen (14) calendar days prior to the start of any detour(s) and road closures. The Engineer will notify the following entities:

- Local 911 Center
- Local School Districts
- Local Post Offices
- DelDOT's Transportation Management Center (TMC)
- Town Managers
- Local Police
- DelDOT's Public Relations
- Delaware Transit Corporation (DTC)

Immediately prior to the implementation of any lane or road closures, the Engineer shall notify the DelDOT TMC at (302) 659-4600. Notifications shall also be provided when the closures are lifted. The Engineer shall notify TMC and the District Safety Officer if any lane closures cannot be removed prior to the end of the allowable work hours.

The Contractor shall notify the local 911 center if access to a fire hydrant is temporarily restricted. The Contractor shall provide written confirmation to the Engineer that the local 911 center has been notified.

If a detour is required during any part or the entire period of this Contract, an approved detour plan shall be obtained from the Department's Traffic Safety Section. All signs, barricades and other temporary traffic control devices required as part of the approved detour plan shall be installed and maintained by the Contractor on the route that is closed and on the detour route. Road closures without an approved detour plan shall not be allowed. If a road is closed without an approved detour plan, the Contractor's operations shall be stopped immediately.

The Contractor shall provide and maintain ingress and egress for each property abutting the construction area and each property located between the diversion points of any detour and the actual construction site. Construction activities which may temporarily or otherwise interfere with property access shall be coordinated in advance with the affected property owners.

The Contractor shall conduct construction operations in a manner which will minimize delays to traffic, and shall meet the following requirements:

1. If work is being performed within 200 feet in any direction of an intersection that is controlled by a traffic signal, the flagger(s) shall direct the flow of traffic in concert with the traffic signals in construction areas to avoid queuing, unless active work prohibits such action. The flagger shall direct traffic to prevent traffic from queuing through an intersection (i.e., blocking an intersection). Only a Traffic Officer may direct traffic against the operation of a traffic signal and only until the operation occurring within the intersection is completed.
2. When a lane adjacent to an open lane is closed to travel, the temporary traffic control devices shall be set 2 feet (0.61 m) into the closed lane from the edge of the open lane, unless an uncured patch exists or actual work is being performed closer to the open lane with minimum restriction to traffic.
3. Except for "buffer lanes" on high volume and/or high speed roadways, lanes shall not be closed unless construction activity requiring lane closure is taking place, or will take place within the next hour. Lanes shall be reopened immediately upon completion of the work. Moving operations will require the lane closures be shortened as the work progresses and as traffic conditions warrant to minimize the length of the closure. The Contractor shall conduct construction operations in a manner so as to minimize disruption to traffic during peak hours and

periods of heavy flow. The Department reserves the right to stop or change the Contractor's operations, if in the opinion of the Engineer, such operations are unnecessary at that time or the operations are unnecessarily impeding traffic.

4. Work in the vicinity of traffic signals, shall be scheduled to minimize the time during which the signal is operated without detectors, and prior approval from the Engineer shall be required. TMC shall be notified in advance of cutting a loop detector, and be immediately notified once the loop detector has been reinstalled. The Contractor shall provide sufficient advance notice of the loop detector work with the Engineer to ensure the aforementioned requirements are met.

It is required that all temporary traffic control work and related items shall either be performed entirely by the Contractor's own organization, or totally subcontracted. Maintenance of equipment shall not be subject to this requirement.

Any deficiencies related to temporary traffic control that are reported to the Contractor in writing shall be corrected within 24 hours or as directed by the Engineer. Failure to comply will result in non-payment for those devices that are found to be deficient for the duration of the deficiency. Serious deficiencies that are not corrected immediately shall result in suspension of work until items identified are brought back into compliance.

At the end of each day's work, the Contractor shall correct all pavement edge drop-offs in accordance with Table 6G-1 in the Delaware MUTCD. This corrective work shall be accomplished with Temporary Roadway Material (TRM) unless an alternate method is specified in the Plans. All ruts and potholes shall be filled with TRM as soon as possible but no later than the end of each work day. Placement and Payment of TRM shall be completed in accordance with Section 402 of the Standard Specifications. If temporary elimination of a drop-off hazard cannot be accomplished, then the area should be properly marked and protected with temporary traffic control devices such as temporary barricades, warning signs, flashing lights, etc. as required by Section 6G.21 of the Delaware MUTCD.

All open trench excavation accessible by vehicular traffic must be backfilled prior to the end of each working day. Steel plates shall not be used except in emergency situations and only with prior written approval from the Engineer unless otherwise directed by the Plans.

The Contractor shall submit, at or prior to the preconstruction meeting, detailed drawings including but not limited to existing striping lengths, lane and shoulder widths, turn lane lengths, locations of stop bars, turn arrows, crosswalks and railroad crossings. The drawings shall depict the existing pavement markings for each project location. These drawings will be reviewed by the Department's Traffic Section to determine the need for modification(s) for compliance with the Delaware MUTCD. Temporary pavement markings, on the final pavement surface, shall match the Plan dimensions and layout or the approved drawings of the permanent markings in compliance with Section 3 of the Delaware MUTCD. All conflicting or errant striping shall be removed as directed by the Engineer in compliance with the specifications for Item 748530 (Removal of Pavement Striping).

At the end of each day's operation and before traffic is returned to unrestricted roadway use, temporary striping shall be utilized when the existing pavement is milled and hot mix will not be placed the same day or more than a single course of hot mix is to be placed or permanent roadway striping cannot be placed on the same day as the placement of the final course of hot mix. Placement of temporary striping shall receive prior approval from the Engineer and the contractor shall apply temporary pavement markings in accordance with the requirements of Section 748 of Delaware Standard specifications and the Delaware MUTCD. Payment for temporary pavement striping shall be made at the unit price bid for item 748 - Temporary Striping. Payment for final striping will be included in the applicable striping item.

The Contractor shall have temporary striping/delineating materials (such as raised markers, tape, and other approved materials) available at the job site for verification by the Department prior to starting the hot-mix paving operation on roads to be immediately opened to traffic. These materials shall be used by the Contractor for temporary markings if he/she fails to apply temporary marking paint, etc., as required by the Delaware MUTCD. No paving operations on roads to be immediately opened to traffic will be allowed unless such verification has been made for the availability of the materials at the job site.

Travel lane and ramp closings on multilane highways and Interstates shall not be permitted during the following holiday periods:



- December 24 through December 27 (Christmas Day)
- December 31 through January 3 (New Years Day)
- Friday prior to Easter through Easter Sunday
- Thursday prior to Memorial Day through the Tuesday following Memorial Day
- Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)
- July 3 through July 5 (Independence Day)
- Thursday prior to Labor Day through the Tuesday following Labor Day
- Wednesday prior to Thanksgiving Day through the Monday following Thanksgiving Day

Additional time restrictions may apply as noted in the project plans or as directed by the Engineer. Any requests to waive any restrictions must be made in writing to the Engineer for review and approval. A copy of the request shall be provided to the District Safety Officer for review.

### **Certification:**

Temporary traffic control devices used on all highways open to the public in this State shall conform to the Delaware MUTCD. All devices shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, the memorandum issued August 28, 1998 by The USDOT Federal Highway Administration, and/or in accordance with the latest edition of the Manual for Assessing Safety Hardware (MASH), published by the American Association of State Highway and Transportation Officials (AASHTO).

The Contractor shall submit certification for temporary traffic control devices or vendors used specifically on this project at or prior to the pre-construction meeting.

Certification of compliance with NCHRP report 350 and/or MASH is required for the following categories of temporary traffic control devices:

**Category I** contains small and lightweight channelizing and delineating control devices which includes cones, tubular markers, flexible delineator post and drums, all without any accessories or attachments.

**Category II** includes temporary traffic control devices that are not expected to produce significant vehicular velocity changes to impacting vehicles. These devices which shall weigh 45 kg or less, include Type I, II and III barricades, portable sign supports with signs, and intrusion alarms. Also included are drums, cones, and vertical panels with accessories or attachments.

**Category III** includes temporary traffic control devices that are expected to cause significant vehicular velocity changes to impacting vehicles. These devices which weigh more than 45 kg include temporary barrier, temporary impact attenuators, and truck-mounted attenuators.

**Category IV** includes portable or trailer-mounted devices such as arrow panels, variable message signs, temporary traffic signals and temporary area lighting.

For Category I devices, the manufacturer or Contractor may self-certify that the devices meet the NCHRP-350 and/or MASH criteria. The Contractor shall supply the Federal Highway Administration's NCHRP-350 and/or MASH acceptance letter for each type of device that falls under Category II and III devices.

### **Basis of Payment:**

Payment will be made at the Lump Sum price for "Maintenance of Traffic", for which price and payment constitutes full compensation for all maintenance of traffic activities accepted by the Engineer, which shall include the cost of furnishing and relocating permanent and temporary traffic control signs, traffic cones or drums, submission of temporary traffic control plan(s), submission of existing pavement marking drawings, submission of all required certifications, labor, equipment and incidentals necessary to complete the item. Payment to furnish and maintain other temporary traffic control devices including but not limited to Portable P.C.C. Safety Barrier, Truck Mounted Attenuators, Portable Changeable Message Signs, Arrow Panels and Portable Light Assemblies will be made at the contract unit price for each item.

### **NOTE**

If the Contractor does not complete the Contract work within the Contract completion time (including approved extension time), the Contractor shall be responsible for providing the necessary temporary traffic control devices that are required to complete any remaining work. The costs of such temporary traffic control shall be borne by the Contractor. No additional payment will be made to the Contractor to maintain traffic in accordance with the Delaware MUTCD, contract plans and specifications. Temporary traffic control items include, but not be limited to, warning lights, warning signs, barricades, plastic drums, P.C.C. safety barrier, flaggers, traffic officers, arrow panels, message boards, and portable impact attenuators.

6/21/2011







STATE OF DELAWARE  
DEPARTMENT OF TRANSPORTATION  
800 BAY ROAD  
P.O. Box 778  
DOVER, DELAWARE 19903

SHAILEN P. BHATT  
SECRETARY

UTILITY STATEMENT  
STATE CONTRACT #T201007402  
F.A.P. #EBHOS-N049(1)  
PROJECT I.D. #09-01049  
BR. 1-585 ON N049 AUGUSTINE CUTOFF OVER BRANDYWINE CREEK  
NEW CASTLE COUNTY

The following utilities maintain facilities within the limits of this project:

DELMARVA POWER – ELECTRIC DISTRIBUTION  
DELMARVA POWER - GAS  
VERIZON DELAWARE INC.  
COMCAST CABLEVISION, INC.  
ARTESIAN WATER  
NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES

**DELMARVA POWER – ELECTRIC DISTRIBUTION**

Delmarva Power maintains a bank of 4 – 4" diameter steel conduits attached to the structure that are leased to other companies that provide fiber optic cable services. There are no apparent conflicts. Please refer to marked up **final plans** for approximate locations of electric facilities.

*Outages on the 12kv circuits will only be permitted as load, weather and other system conditions permit.*

For exact location of electric facilities, please contact Miss Utility at (800) 282-8555.

**16 Del. C. § 7405B requires notification to and mutually agreeable measures from the public utility from any person intending to carry on any function, activity, work or operation within dangerous proximity of any high voltage overhead lines. All contractors/other utilities must also maintain a distance of 10'-0" from all energized lines.**

Any relocations/adjustments to any existing electric lines/poles shall be arranged, if necessary, with the owners during the construction of the project. The time to complete any additional relocations/adjustments will depend on the nature of the work.

**General**

No existing electric facilities can be taken out of service until the replacement facilities are installed and in operation.

**DELMARVA POWER (GAS)**

Delmarva Power maintains a 12" steel high pressure gas main attached to the bridge structure. throughout the project limits. The company plans to inspect the existing gas main and rewrap as necessary. This work will take 24 calendar days and will be coordinated between Delmarva Power – gas and the State's contractor.

Any additional relocations/adjustments to any existing gas lines shall be arranged, if necessary, with the owners during the construction of the project. The time to complete any additional relocations/adjustments will depend on the nature of the work.

**General**

No existing gas facilities can be taken out of service until the replacement facilities are installed and in operation.

**VERIZON DELAWARE INC.**

Verizon maintains facilities near the project limits with no apparent conflicts.

Any relocations/adjustments to any existing aerial/underground lines or poles shall be arranged, if necessary, with the owners during the construction of the project. The time to complete any additional relocations/adjustments will depend on the nature of the work.

**COMCAST CABLE OF NEW CASTLE COUNTY**

Comcast maintains facilities near the project limits with no apparent conflicts.

Any additional relocations/adjustments to any existing aerial/underground lines shall be arranged, if necessary, with the owners during the construction of the project. The time to complete any additional relocations/adjustments will depend on the nature of the work.

**NEW CASLTE COUNTY DEPT. OF SPECIAL SERVICES**

New Castle County Department of Special Services maintains underground facilities near the limits of the project with no apparent conflicts.

Any additional relocations/adjustments to any existing underground facilities shall be arranged, if necessary, with the owners and performed by the state's contractor during the construction of the project. The time to complete any additional relocations/adjustments will depend on the nature of the work.

**ARTESIAN WATER**

Artesian Water owns/maintains underground water facilities near the limits of the project with no apparent conflicts.



Any relocations/adjustments to any existing underground facilities shall be arranged, if necessary, with the owners and performed by the state's contractor during the construction of the project. The time to complete any additional relocations/adjustments will depend on the nature of the 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 purposes for his equipment and, if necessary, make arrangements directly with the utility companies for field adjustments for adequate clearances.
2. 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.
3. 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 or legal holidays.

Angel Collazo	Delmarva Power – Electric Distribution	(302) 454-4370
Mark Smith	Delmarva Power – Electric Distribution	(302) 454-4138
Ted Waugh	Delmarva Power – Gas	(302) 429-3706
George Zang	Verizon Delaware, Inc.	(302) 422-1238
Clint Rupp	Comcast Cablevision, Inc.	(302) 661-4462
Kevin Penozza	New Castle County Dept. of Sp. Svcs.	(302) 395-5723
Carmen Hunter	Artesian Water	(302) 453-7153

### **DIVISION OF TRANSPORTATION SOLUTIONS**

7/9/2012  
DATE

  
UTILITY COORDINATOR





**STATE OF DELAWARE  
DEPARTMENT OF TRANSPORTATION  
PO BOX 778  
DOVER, DELAWARE 19903**

**CERTIFICATE OF RIGHT-OF-WAY STATUS**

**STATE PROJECT NO. T201007402**

**F.A.P. No. EBHOS-N049(1)**

**BR 1-585 ON AUGUSTINE CUT-OFF OVER BRANDYWINE CREEK**

**NEW CASTLE COUNTY**

**Certificate of Right-of-Way Status – 100%**

**As required by 23CFR Part 635, all necessary right of way has been acquired in accordance with current State/Federal rules and regulations covering the acquisition of real property.**

This is to certify that all project rights of way is currently available in accordance with the project right-of-way plans.

**It is further certified that there were no individuals or families displaced by this project. Therefore the provisions of 49 CFR Part 24 is not applicable to the project.**

There are no improvements to be removed or demolished as part of this project.

REAL ESTATE SECTION

Tom Nickel, Acting Chief of Right of Way

July 9, 2012





STATE OF DELAWARE  
**DEPARTMENT OF TRANSPORTATION**  
800 BAY ROAD  
P.O. Box 778  
DOVER, DELAWARE 19903

SHAILEN P. BHATT  
SECRETARY

August 20, 2012

## **ENVIRONMENTAL REQUIREMENTS**

FOR

State Contract No. T201007402

Federal Aid No.: BHOS-N049(1)

Contract Title: BR 1-585 on N049 Augustine Cutoff over Brandywine Creek

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 D/ Class II Action. As such, a Categorical Exclusion has been prepared to evaluate potential adverse impacts to result from construction of the proposed action (per 23 CFR 771.117 d(3)) and the following special provisions have been developed to mitigate and/or minimize these impacts.

Due to the nature of the proposed construction activities, permits are not required for this project. However, the following construction requirements and special provisions have been developed to minimize and mitigate impact to the surrounding environs. These requirements by DelDOT not specified within the contract, but listed below, are the responsibility of the contractor and is subject to risk of shut down at the contractor's expense if not followed.

### **SPECIFIC REQUIREMENTS:**

Compliance with all requirements of the permits is the responsibility of the contractor will follow all special conditions or requirements as stated within those permits. The contractor will be subject to penalties, fines, and the risk of shut down as mandated by laws governing permitting agencies if such are violated or ignored. Therefore, all special conditions, general requirements, and/or other required provisions specified within the permits must be followed.



Those obligations are indicated or listed within the permit package, which can be obtained from the DelDOT Contract Administration Office.

Additional requirements by DelDOT not specified within the permits, but listed below, is also the responsibility of the contractor and is subject to risk of shut down at the contractor's expense.

1. The contractor shall employ measures during construction to prevent spills of fuels, or lubricants, if a spill should occur, efforts shall be undertaken to prevent its entry into wetlands, aquatic, or drainage areas. Any spills entering wetlands, aquatic, or drainage areas shall be removed immediately. The Division of Water Resources (DNREC), Wetlands & Aquatic Protection Branch, 302-739-4691, shall be notified of any spill(s) within six (6) hours of their occurrence. That office will determine the effectiveness of spill and contamination removal and specify remediation efforts as necessary.
2. All construction debris, excavated material, brush, rocks, and refuse incidental to such work shall be placed either on shore above the influence of flood waters or on some suitable disposal site approved by the department.
3. The disposal of trees, brush, and other debris in any stream corridor, wetland surface water or any drainage ditch is prohibited.
4. There shall be no stockpiling of construction materials or temporary fills in wetlands or subaqueous lands unless otherwise specified on project plans and approved by permitting agencies that govern them. It is the contractor's responsibility to coordinate and secure those additional permits/amendments in deviating from the plan.
5. The effort shall be made to keep construction debris from entering adjacent waterways, wetlands, ground cover, or drainage areas. Any debris that enters these areas shall be removed immediately. Netting, mats, or establishing confined work areas in stages may be necessary to address these issues.
6. If routine maintenance of worker equipment and heavy machinery is necessary during the construction period, refuse material is prohibited from being disposed or deposited onto or into the ground. All used oils and filters must be recycled or disposed of properly.
7. Harmful chemical wash water applied to clean equipment or machinery shall be discouraged. If undertaken, the residue water and/or material must be collected or contained such that it will be disposed of properly. By no means, shall it be deposited or disposed of in waterways, streams, wetlands, or drainage areas.
8. The contractor shall follow all requirements as indicated in the Environmental Compliance Sheet. It will be the contractor's responsibility, expense, & effort to ensure that workers also follow this requirement. As part of the restrictions, please note the timetables reflected in the contract for the in-stream/water work for endangered species protection.

9. That the fill material shall be free of oil and grease, debris, wood, general refuse, plaster and other pollutants, and shall contain no broken asphalt.

#### CULTURAL RESOURCE REQUIREMENTS:

1. The contractor will submit to the District, the location(s) of permanent disposal sites to be used for the disposition of clean wasted materials resulting from the construction contract. The contractor will submit at the Preconstruction meeting, a location map and a plot plan (sketch or diagram) of where on the property clean wasted material is to be placed. The limits of the site(s) will be physically staked or surveyed on the property. The District will submit the contractor's disposal site location(s) to the State Historic Preservation Office for approval.

The SHPO will determine if a cultural resource survey is required before the site can be approved. If additional survey work is required, it will be the contractor's responsibility to hire a qualified professional to assess the site(s) for the presence or absence of cultural resources (i.e. historic or prehistoric archeological sites). The contractor's consultant will be responsible for producing documentation of the survey results for submission to the SHPO.

If the contractor proposes the use of disposal sites outside the State of Delaware, the contractor must provide written approval from the State Historic Preservation Office of each respective state.

A project's disposal operation will not commence until the SHPO has notified the DelDOT District office that the site location(s) is approved for use.

The use of the disposal site will not result in discharge of materials into the U.S. Army Corps of Engineer or DNREC jurisdictional wetlands or waters. It is the responsibility of the contractor to provide any site surveys or wetland delineations needed to preclude wetland encroachment.

The contractor will be responsible for all sediment and erosion control measures and subsequent approvals required for the disposal site(s) operations.

It is the contractor's responsibility to obtain all other appropriate Federal, State, or local approvals required by law for use of the disposal site(s).

2. The contractor shall pay special attention to Notes 13, 32, and 33 within the Project Notes Section, which emphasize limitations for treatment of the historic properties and features surrounding the Brandywine Park Historic District. Any questions or concerns should be addressed to Michael Hahn of DelDOT Environmental Studies Section at [MichaelC.Hahn@state.de.us](mailto:MichaelC.Hahn@state.de.us) or 302-760-2264.

## NATURAL RESOURCES:

The contractor shall pay special attention to specific construction requirements as indicated in the Project Notes.

1. Specifically, please note the environmental requirements as indicated in Project Notes 12 and 23.
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.

**BID PROPOSAL FORMS**  
CONTRACT T201007402.01  
FEDERAL AID PROJECT BHOS-N049(1)  
**BIDDING**





DELAWARE DEPARTMENT OF TRANSPORTATION  
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PAGE: 1  
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CONTRACT ID: T201007402.01 PROJECT(S): BHOS-N049(1)

All figures must be typewritten.

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 PROJECT ITEMS						
0010	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0020	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	CY 30.000				
0030	211002 REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF 189.000				
0040	251000 SILT FENCE	LF 1300.000				
0050	302007 GRADED AGGREGATE BASE COURSE, TYPE B	CY 12.000				
0060	401804 WMA, SUPERPAVE, TYPE C, 160 GYRATIONS PG 70-22 (CARBONATE STONE)	TON 88.000				
0070	601522 TEMPORARY PROTECTIVE SHIELD	SF 1100.000				
0080	602001 PORTLAND CEMENT CONCRETE MASONRY, CLASS A	CY 5.000				
0090	602013 PORTLAND CEMENT CONCRETE MASONRY, SUPERSTRUCTURE, CLASS D	CY 30.000				



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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0100	602574 DECK REPAIR, 1/4" TO 1" DEPTH	SF 100.000				
0110	602575 DECK REPAIR, 1" TO 3" DEPTH	SF 100.000				
0120	602576 DECK REPAIR, 3" TO < FULL DEPTH	SF 100.000				
0130	602577 DECK REPAIR, FULL DEPTH	SF 10.000				
0140	602579 DRILLING HOLES AND INSTALLING DOWELS	EACH 100.000				
0150	602580 PARTIAL REMOVAL OF P.C.C. MASONRY	CY 30.000				
0160	602586 REHABILITATION OF CONCRETE STRUCTURE	CF 26.000				
0170	602611 REPAIR OF CONCRETE STRUCTURES BY EPOXY INJECTION	LF 50.000				
0180	602646 SILICONE ACRYLIC CONCRETE SEALER	SF 8626.000				
0190	602733 POLYESTER POLYMER CONCRETE OVERLAY	SYIN 5475.000				



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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0200	603500 REPLACING BAR REINFORCEMENT	4100.000 LB				
0210	605511 PREFABRICATED EXPANSION JOINT SYSTEM, 3 "	116.000 LF				
0220	605522 URETHANE PAINT SYSTEM, EXISTING STEEL	LUMP	LUMP			
0230	605532 CLEANING EXISTING STEEL STRUCTURES (NON-HAZARDOUS BASE)	LUMP	LUMP			
0240	605578 REPLACING STEEL RIVETS/BOLTS	62.000 EACH				
0250	605584 STEEL STRUCTURE REPAIR	12100.000 LB				
0260	605606 TEMPORARY BRIDGE SUPPORT SYSTEM	LUMP	LUMP			
0270	605670 BRIDGE JOINT DRAIN TROUGH	LUMP	LUMP			
0280	605693 SILICONE JOINT SEAL, 1 "	367.000 LF				
0290	605709 WELD REPAIRS	18.000 LF				



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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0300	605732 REPLACE STEEL TAP BOLT	EACH 1.000				
0310	605733 PIN AND HANGER RETROFIT	LUMP	LUMP			
0320	610502 POINTING EXISTING STONE MASONRY	LF 3700.000				
0330	611503 GRAFFITI REMOVAL	SF 4000.000				
0340	612502 PVC PIPE, 6"	LF 180.000				
0350	612503 PVC PIPE, 8"	LF 90.000				
0360	705001 P.C.C. SIDEWALK, 4"	SF 900.000				
0370	712005 RIPRAP, R-4	SY 113.000				
0380	720585 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	EACH 3.000				
0390	725001 GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE 31)	EACH 1.000				





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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0400	725002 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31	EACH 3.000				
0410	726001 END ANCHORAGE 31	EACH 1.000				
0420	727004 CHAIN-LINK FENCE, 6' HIGH	LF 1864.000				
0430	727006 TERMINAL POSTS FOR 6' CHAIN-LINK FENCE	EACH 16.000				
0440	727007 CHAIN-LINK FENCE, 8' HIGH	LF 12.000				
0450	727008 TERMINAL POSTS FOR 8' CHAIN-LINK FENCE	EACH 2.000				
0460	727014 CONSTRUCTION SAFETY FENCE	LF 1640.000				
0470	727547 REMOVAL OF FENCE	LF 1870.000				
0480	732005 TOPSOIL (CY)	CY 243.000				
0490	734013 PERMANENT GRASS SEEDING, DRY GROUND	SY 1428.000				



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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0500	735535 SOIL RETENTION BLANKET MULCH, TYPE 5	1428.000 SY				
0510	743005 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY	360.000 EADY				
0520	743007 TRAFFIC OFFICERS	288.000 HOUR	75.00000		21600.00	
0530	743008 REFLECTOR PANELS	22.000 EACH				
0540	743010 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	245.000 EADY				
0550	743015 FURNISH AND MAINTAIN PORTABLE PCC SAFETY BARRIER	1100.000 LF				
0560	743023 TEMPORARY BARRICADES, TYPE III	6024.000 LFDY				
0570	743025 INSTALL TEMPORARY IMPACT ATTENUATOR	2.000 EACH				
0580	743028 FURNISH TEMPORARY IMPACT ATTENUATOR - NON-GATING, REDIRECTIVE, TEST-LEVEL 2	2.000 EACH				
0590	743050 FLAGGER, NEW CASTLE COUNTY, STATE	3920.000 HOUR	52.90000		207368.00	



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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0600	743062 FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	1960.000 HOUR	76.71000		150351.60	
0610	746647 REPLACEMENT OF ALUMINUM HANDHOLE COVER AND FASTENERS	8.000 EACH				
0620	746648 REPLACEMENT OF STEEL FASTENERS	2.000 EACH				
0630	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	605.000 SF				
0640	748033 PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 5"	28.000 LF				
0650	748525 TEMPORARY MARKINGS, TAPE, 4"	5940.000 LF				
0660	748529 RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, SYMBOL/LEGEND	70.000 SF				
0670	748530 REMOVAL OF PAVEMENT STRIPING	3750.000 SF				
0680	748548 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	8028.000 LF				



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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0690	748553 PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL	EACH 1.000				
0700	748557 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"	LF 1745.000				
0710	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH 33.000				
0720	749688 INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" DEPTH	EACH 9.000				
0730	758000 REMOVAL OF EXISTING PORTLAND CEMENTCONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	SY 100.000				
0740	759501 FIELD OFFICE, SPECIAL	EAMO 17.000				
0750	760001 PAVEMENT - MILLING CONCRETE	SYIN 5475.000				
0760	760006 PAVEMENT - MILLING, HOT-MIX, 2" DEPTH	SY 840.000				
0770	762001 SAW CUTTING, HOT MIX	LF 80.000				





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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0780	762002 SAW CUTTING, CONCRETE, FULL DEPTH	240.000 LF				
0790	763000 INITIAL EXPENSE	LUMP	LUMP			
0800	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
0810	763503 TRAINEE	1040.000 HOUR	0.80000		832.00	
0820	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
0830	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	17.000 EAMO				
0840	763522 COAST GUARD SPECIFIC CONDITIONS	LUMP	LUMP			
0850	763643 MAINTENANCE OF TRAFFIC, ALL INCLUSIVE	LUMP	LUMP			
	SECTION 0001 TOTAL					
	TOTAL BID					



## CERTIFICATION

Contract No. T201007402.01  
Federal Aid Project No. BHOS-N049(1)

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.

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(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.

I/We are licensed, or have initiated the license application as required by Section 2502, Chapter 25, Title 30, of the Delaware Code.

By submission of this proposal, each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

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I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date
-----	------	-----	------	-----	------	-----	------	-----	------

FAILURE TO ACKNOWLEDGE RECEIPT OF ALL ADDENDA AND FINAL QUESTIONS AND ANSWERS WILL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

**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

T201007402.01

**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. T201007402.01, to be paid  
to the **State** for the use and benefit of its Department of Transportation ("**DelDOT**") for which payment well and  
truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors,  
jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal** who  
has submitted to the **DelDOT** a certain proposal to enter into this contract for the furnishing of certain materiel  
and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and truly enter  
into and execute this Contract as may be required by the terms of this Contract and approved by the **DelDOT**, this  
Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance  
with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with \_\_\_\_\_ seal and dated this \_\_\_\_\_ day of \_\_\_\_\_ in the year of our Lord two thousand and \_\_\_\_\_  
( 20\_\_ ).

SEALED, AND DELIVERED IN THE  
presence of

\_\_\_\_\_  
Name of Bidder (Organization)

Corporate  
Seal

By: \_\_\_\_\_

\_\_\_\_\_  
Authorized Signature

Attest \_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of **Surety**

Witness: \_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_  
Title