

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION



BID PROPOSAL

CONTRACT T202107401

**STRUCTURE REHABILITATION, CANAL DISTRICT,
OPEN END, FY21-FY23**

Advertisement Date: October 20, 2020

INCLUDED IN THIS DOCUMENT:

BID PROPOSAL:

*GENERAL DESCRIPTION
PROSPECTIVE BIDDERS NOTES
GENERAL NOTICES
PREVAILING WAGES
SPECIAL PROVISIONS
SAMPLE AFFIDAVIT - CRAFT TRAINING
QUANTITY SHEET SUMMARY*

ADDITIONAL BID PROPOSAL ITEMS:

ATTACHED OR POSTED DOCUMENTS:

*PROJECT PLANS
QUESTIONS & ANSWERS (if posted)
GUARDRAIL END-TREATMENT INFO*

**PAPER BIDDERS CONTACT DELDOT
FOR BID SUBMITTAL DOCUMENTS:**

*DRUG TESTING AFFIDAVIT;
CERTIFICATION FORM;
BID BOND FORM;
CD FOR BID PRICE ENTRY & PRINTING*

This Bid Proposal and related documents can be viewed on bids.delaware.gov and, for subscribers bidx.com/de/

Internet Bids for Bidders with Bid Express® accounts can be submitted at [BIDX.com/de](https://bidx.com/de/); **OR**;

Paper Bids With CD will be received at the DelDOT Administration Building, Dover, DE;

ALL BIDS DUE PRIOR TO 2:00 P.M. Local Time, November 17, 2020

GENERAL DESCRIPTION

- A. BIDS DUE:** **NOVEMBER 17, 2020 PRIOR TO 2:00 P.M. Local Time** – unless changed via Addendum.
LOCATION: Bidder's Room, DelDOT Administration Building, 800 South Bay Road, Dover, DE 19901.
OR: Bidders with Bid Express® accounts can submit bids at BIDX.com/de.
- B. PRE-BID MEETING:** No
- C. LOCATION:** NEW CASTLE County
These improvements are more specifically shown on the Location Map(s) of the attached Plans.
- D. DESCRIPTION:** The improvements consist of furnishing all labor and materials for the rehabilitation, repairs and preventive maintenance to bridges and culverts in Canal District. The work shall include but not be limited to crack sealing decks, hot-mix repair, coating parapets and sidewalks, expansion joint replacement, riprap placement, and concrete repair.
- E. COMPLETION TIME:** All work on this contract must be complete within 1,095 Calendar Days.
The Contract Time includes an allowance for 0 Weather Days.
The Department's intent is to issue a Notice to Proceed for work to start on or about December 21, 2020.
- F. SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, DELAWARE DEPARTMENT OF TRANSPORTATION, AUGUST 2016** apply to this Bid Proposal and Project. The Contractor shall make himself aware of any revisions and corrections (Supplemental Specifications, if any) and apply them to the applicable item(s) of this contract. The Standard and Supplemental Specifications can be viewed [here](#). Units of Measure can be found at 101.04.
- G. ATTACHMENTS:** Included as part of this Bid Proposal are; *Project Plans*; *Questions & Answers* (if posted); *Addenda* (if issued), *Referenced Documents*, *Documents Posted with this Bid Proposal*; and *Bid documents mailed to contractors*.
- H. ADDENDA:** All Addenda are posted on the internet at bids.delaware.gov, and bidx.com/de/ and are included as part of the Bid Proposal. The Bidder is responsible to check the Website as needed to ensure that the Bidder is aware of Addenda that are included in the Bid Proposal. If Addenda are issued, the final Addendum will be posted no later than the end of the day two business days prior to the bid date. Each Addendum number and issue date must be entered on the submitted Certification Form. This original Bid Proposal will not be updated, you must refer to each Addendum.
- I. QUESTIONS:** E-MAIL TO; dot-ask@delaware.gov
Questions regarding this project are to be e-mailed to the above address no less than **six business days** prior to the bid opening date in order to receive a posted response. Please include the Contract number in the subject line. Questions and responses are posted at bids.delaware.gov, and bidx.com/de/. The date of the final posted Questions and Answers document must be entered on the submitted Certification Form.

Prospective Bidders Notes begin on the following page...

J. PROSPECTIVE BIDDERS NOTES:

1. CRAFT TRAINING (29 Del. C. § 6962(c)(13)), § 6962(d)(13)) **NEW**

The Craft Training Regulations relating to Public Works Contracting, signed into law on June 7, 2019 are now in effect. These regulations require certain contractors and subcontractors on public works projects to commit to provide craft training for journeyman and apprentice levels at the time of contract execution.

Refer to the full requirements at the following link: <https://delcode.delaware.gov/sessionlaws/ga150/chp036.pdf>

Note a few of the requirements;

- If there is a craft training program for a craft in this project, the awarded contractor must commit to provide (and commit that subcontractors must provide) craft training for journeyman and apprentice levels at the time the contractor executes the public works contract if all of the following apply:
 1. This project meets the prevailing wage requirement under § 6960 of this title.
 2. The contractor (or subcontractor) employs 10 or more total employees.
 3. The project is not a federal highway project, except for the US 301 project from the MD/DE state line to RT 1.
- The craft training required may be provided by any of the following: The contractor; The subcontractor; A program registered under § 1101-4.0 of Title 19 of the Delaware Administrative Code.
- Any contractor who fails to perform a public works contract or complete a public works project within the time schedule established by the agency in the invitation to bid, may be subject to suspension or debarment for 1 or more of the following reasons: Failure to supply the adequate labor supply ratio for the project; Inadequate financial resources; Poor performance on the project; Failure to provide required craft training.
- Any subcontractor who fails to provide required craft training may be subject to suspension or debarment.
- The public works contract must include a requirement that the contractor provide, and the subcontractor provide, craft training for journeyman and apprentice levels if all the above subparagraphs 1, 2, and 3 apply.
- An Affidavit Of Craft Training Compliance form will be provided for signature at contract execution (sample attached).

2. BIDDERS MUST BE REGISTERED with DelDOT in order to submit a bid. E-Mail dot-ask@delaware.gov or call (302) 760-2031 to request registration information.

3. BIDS MUST BE SUBMITTED VIA:

(a) **Internet** - Bidders with Bid Express[®] accounts can submit bids at www.bidx.com/de/.

OR:

(b) **Paper Bid** with supplied CD and printout of Bid Item prices and all required documents and forms.

For paper bids, contact DelDOT at dot-ask@delaware.gov or (302) 760-2031 to request a CD for bidding, required forms, and instructions. Bidders enter their Bid Item prices into the supplied CD then print the form and submit the printed prices form along with the CD and other required documents prior to the Bid due date/time.

(CD's cannot be used to submit bids to bidx.com)

Do not submit both Internet and Paper Bids. If so, the Internet bid will be rejected.

4. SURETY BOND - Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the amount bid.

5. DRUG TESTING - Regulation 4104; The state Office of Management and Budget has developed regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 Del.C. §6908(a)(6). **Refer to the full requirements at the following link:**

<http://regulations.delaware.gov/register/december2017/final/21%20DE%20Reg%20503%2012-01-17.htm>

Note a few of the requirements;

- * At bid submission - Each bidder must submit with the bid a single signed affidavit certifying that the bidder and its subcontractors has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program that complies with the regulation (*a blank affidavit form is attached*);

- * At least two business days prior to contract execution - The awarded Contractor shall provide to DelDOT copies of the Employee Drug Testing Program for the Contractor, each participating DBE firm, and all other listed Subcontractors;
 - * Subcontractors - Contractors that employ Subcontractors on the job site may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program along with the standard required subcontractor information. A Subcontractor shall not commence work until **DelDOT** has approved the program in writing.
6. **PERFORMANCE-BASED RATING SYSTEM** - 29 Del.C. §6962 (c)(12)(a) requires DelDOT to include a performance-based rating system for contractors. The Performance Rating for each Contractor shall be used as a prequalification to bid at the time of bid. Refer to '*General Notices*' for details.
 7. **NO RETAINAGE** will be withheld on this contract unless through the Performance-Based Rating System.
 8. **EXTERNAL COMPLAINT PROCEDURE** can be viewed on DelDOT's Website, https://deldot.gov/Business/cr/index.shtml?dc=civil_rights_eeo or request a copy by calling (302) 760-2555.
 9. **DELAWARE BUSINESS LICENSE**; a copy of your firm's Business License must be submitted with your bid.
 10. **SECTION 106.06 BUY AMERICA** Contract Requirement in the Delaware Standard Specifications for Road and Bridge Construction, August, 2016 does not apply to this contract.
 11. **FLATWORK CONCRETE TECHNICIAN CERTIFICATION TRAINING**:
Section 501.03, 503.03, 505.03, 610.03, 701.03 and 702.03 of the 2016 Standard Specifications require contractors to provide an American Concrete Institute (ACI) or National Ready-Mix Concrete Association (NRMCA) certified concrete flatwork technician to supervise all finishing of flatwork concrete.

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GENERAL NOTICES

SPECIFICATIONS :

The Delaware specifications entitled "*Standard Specifications for Road and Bridge Construction August, 2016*", hereinafter referred to as the *Standard Specifications*; the *Supplemental Specifications* to the Standard Specifications effective as of the advertisement date of this Bid Proposal and hereby included by reference; the *Special Provisions*; *Notes on the Plans*; this *Bid Proposal* including referenced documents; any *Addenda* thereto; and any posted *Questions and Answers*; shall govern the work to be performed under this contract. The Contractor shall make itself aware of these specifications, revisions and corrections, and apply them to the applicable item(s) of 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.

PERFORMANCE-BASED RATING SYSTEM

29 Del.C. §6962 (c)(12)(a) requires a Department of Transportation project, excluding a Community Transportation Fund or municipal street aid contract, to include a performance-based rating system. At the time of bid, the Performance Rating for each Contractor shall be used as a prequalification to bid.

Bidders with Performance Rating scores equal to or greater than 85% shall be permitted to bid. Bidders with scores of less than 85% who comply with the retainage requirements of 29 Del.C. §6962 shall be permitted to bid provided the *Agreement to Accept Retainage* (located on the Certification Page) is executed and submitted with the bid. Lack of an executed *Agreement to Accept Retainage* will result in the rejection of the bid by the Department. Successful bidders awarded Department contracts who have no performance history within the last five (5) years will be assigned a provisional Performance Rating of 85% at the date of advertisement.

Notification of Performance Rating. The Department shall post publicly the Performance Rating for all Contractors on the Department's [website](#). DelDOT will complete performance-based evaluations on the construction company contracted by the Department to build the project (the "Contractor"). Provisions to appeal Performance Ratings are described in the regulations. The regulations are set forth in Section 2408 of Title 2, Delaware Administrative Code, found [here](#).

PREFERENCE FOR DELAWARE LABOR:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (4)b: "In the construction of all public works for the State or any political subdivision thereof, or by firms contracting with the State or any political subdivision thereof, preference in employment of laborers, workmen or mechanics shall be given to bona fide legal citizens of the State who

have established citizenship by residence of at least 90 days in the State. Each public works contract for the construction of public works for the State or any political subdivision thereof shall contain a stipulation that any person, company or corporation who violates this section shall pay a penalty to the Secretary of Finance equal to the amount of compensation paid to any person in violation of this section."

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS :

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

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

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

1. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation, gender identity or national origin. The contractor will take positive steps to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color, sex, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.
2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, sexual orientation, gender identity or national origin.
3. The contractor will ensure employees receive equal pay for equal work, without regard to sex. Employee pay differential is acceptable if pursuant to a seniority system, a merit system, a system which measures earnings by quantity or quality of production, or if the differential is based on any other factor other than sex.

TAX CLEARANCE :

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

CONTRACTOR / SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

- (b) No agency shall accept a proposal for a public works contract unless such contractor has provided a proper and current copy of its occupational and/or business license, as required by Title 30, to such agency.
- (c) Any contractor that enters a public works contract must provide to the agency to which it is contracting, within 30 days of entering such public works contract, copies of all occupational and business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the contractor entered the public works contract the occupational or business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

DIFFERING SITE CONDITIONS:

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

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

Upon written notification, the engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice. No contract adjustment will be allowed under their clause for any effects caused on unchanged work.

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

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

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

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

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

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

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

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

RIGHT TO AUDIT

The Department shall have the right to audit the books and records of the contractor or any subcontractor under this contract or subcontract to the extent that the books and records relate to the performance of the contract or subcontract. The books and records shall be maintained by the contractor for a period of 3 years from the date of final payment under the prime contract and by the subcontractor for a period of 3 years from the date of final payment under the subcontract (29 Del.C. §6930)

PREVAILING WAGES

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

REQUIREMENT BY DELAWARE DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

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

(c) Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the [Delaware] Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

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

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

Contractors with questions may contact:

Department of Labor, Division of Industrial Affairs,
4425 N. Market Street, Wilmington, DE 19802
Telephone (302) 761-8200
<https://dia.delawareworks.com/labor-law/>

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 761-8200

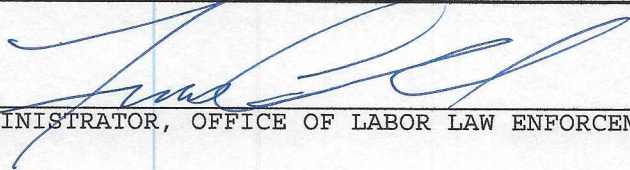
Mailing Address:
4425 North Market Street
3rd Floor
Wilmington, DE 19802

Located at:
4425 North Market Street
3rd Floor
Wilmington, DE 19802

PREVAILING WAGES FOR HIGHWAY CONSTRUCTION EFFECTIVE MARCH 13, 2020

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	57.94	57.94	57.94
CARPENTERS	57.07	56.46	44.83
CEMENT FINISHERS	59.27	36.35	28.90
ELECTRICAL LINE WORKERS	29.93	48.35	23.66
ELECTRICIANS	72.49	72.49	72.49
IRON WORKERS	72.84	26.57	28.22
LABORERS	46.12	42.45	41.67
MILLWRIGHTS	17.94	17.41	15.03
PAINTERS	73.29	73.29	73.29
PILEDRIVERS	79.62	26.45	30.00
POWER EQUIPMENT OPERATORS	69.07	44.10	40.40
SHEET METAL WORKERS	25.34	22.61	20.48
TRUCK DRIVERS	38.23	31.44	38.30

CERTIFIED: 10/02/2020

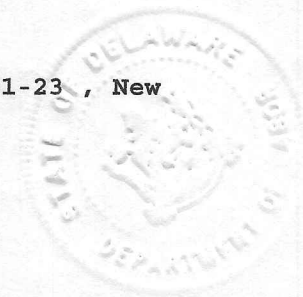
BY: 
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

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) ~~761-8200~~ 761-8200

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

PROJECT: T202107401 Structure Rehabilitation, Canal District Open End FY21-23, New Castle County



SPECIAL PROVISIONS

S.P. Code	SPECIAL PROVISION DESCRIPTION
401502-15	ASPHALT CEMENT COST ADJUSTMENT
401540-15	NIGHTTIME PAVING SURCHARGE, NEW CASTLE COUNTY
401580-15	RIDE QUALITY OF HOT-MIX PAVEMENT
401699-15	QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE
503543-15	NIGHTIME P.C.C. PATCHING SURCHARGE, NEW CASTLE COUNTY
601501-15	SPRAY APPLIED STRUCTURAL LINER FOR PIPES
601503-15	CLEANING BRIDGE SCUPPERS
616501-15	MOISTURE CURED URETHANE PAINT SYSTEM (RECOATING) S.F.
624502-15	SILICONE COATED FOAM JOINT SEAL
628501-15	DECK REPAIR, POLYESTER POLYMER CONCRETE
763544-15	ROAD LOCATION MOBILIZATION, ZONE 1

Contract No. T202107401

401502 - ASPHALT CEMENT COST ADJUSTMENT

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

The Delaware Posted Asphalt Cement Price will be issued monthly by the Department and will be the industry posted price for Asphalt Cement, F.O.B. Philadelphia, Pennsylvania. The link for the posting is https://deldot.gov/Business/bids/index.shtml?dc=asphalt_cement_english.

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

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

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

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

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

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

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

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

NOTE:

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

9/16/2020

Contract No. T202107401

401540 - NIGHTTIME PAVING SURCHARGE, NEW CASTLE COUNTY

401541 - NIGHTTIME PAVING SURCHARGE, KENT COUNTY

401542 - NIGHTTIME PAVING SURCHARGE, SUSSEX COUNTY

Description:

The item(s) Nighttime Paving Surcharge consist of compensating the Contractor for the cost differential for nighttime paving when such work is directed by the Department to be performed outside the Contractor's normal working hours. For the purpose of these items, the normal work hours are considered to be from 7 a.m. to 5 p.m.

All requirements of Section 401 shall be applicable to these items except as modified herein and in the Superpave Special Provisions.

Method of Measurement:

The Contractor will be paid an additional amount per ton as a surcharge over the Contract unit price bid for each type of bituminous concrete to be used including paving surcharge for that particular zone.

Basis of Payment:

The payment for the item will be made at the Contract unit price per ton bid for the item "Nighttime Paving" for the applicable Zones in the Contract, which price will be full compensation. All costs such as, but not limited to, illumination and premium pay costs shall be incidental to these items.

05/31/17

Contract No. T202107401

401580 - RIDE QUALITY OF BITUMINOUS PAVEMENT

Description:

This specification outlines requirements for an acceptable ride surface in addition to requirements established in DeDOT Standard Specifications. The Contractor is responsible for providing smoothness characteristics that meet these requirements. The Contractor is responsible for providing equipment, maintenance of traffic (MOT) as required by the Delaware MUTCD, and performing testing in accordance to this specification. All costs for testing and MOT are incidental to this item. Both the International Roughness Index (IRI) and deviations located within a 10' straightedge are used to characterize smoothness in this Special Provision.

Definitions:

Class 1 Project - a project that consists of full depth construction. Full depth construction is considered to be when contract documents or modifications provide opportunity for preparation of the subgrade prior to paving.

Class 2 Project - a project that consists of a minimum of two smoothness opportunities.

Class 3 Project - a project that consists of one smoothness opportunity.

Deviation - a hump or depression that exceeds defined tolerances.

Smoothness Opportunity - a smoothness opportunity is considered to be any of the following; roadway milling, placement of a leveling course, in-place recycling, or placement of a lift of bituminous concrete. The final wearing surface is considered one smoothness opportunity.

Equipment:

The Contractor must have a 10' straightedge available during all paving operations.

The Contractor must also have a high speed or lightweight inertial profiling system that meets requirements of AASHTO M328 capable of collecting data in both wheelpaths simultaneously.

Contract No. T202107401

Prior to the start of corrective actions, the Contractor must provide to the Engineer:

1. Manufacturer, Make, and Model of the test system
2. Equipment Owner,
3. Relevant Certifications,
4. Manufacturer Calibration Procedures, and
5. Relevant Operator Training information.

Testing:

The Contractor is responsible for testing the pavement surface using an approved inertial profiler in accordance to manufacturer and AASHTO R57 from the start of paving limits to the end of pavement limits. Testing must be performed 3 times in each lane paved in the direction of traffic flow. Testing must be performed within seven (7) days of completion of project paving operations in each location.

The Contractor is responsible for providing information relative to locations that are to be excluded from calculation of the International Roughness Index. These areas must still meet 10' straightedge requirements.

Areas that are to be tested but will be removed prior to IRI analysis are:

1. 50 feet prior to the first bridge deck expansion joint and 50 feet after the last expansion joint if a bridge deck is excluded from smoothness operations.
2. 50' longitudinally from the center of an existing obstruction within the test area such as a manhole, water main, or catch basin that impedes paving operations.
3. 50' longitudinally from transverse joints that separate it from existing pavement not included on this contract.

Areas that are not to be profiled but are still subject to 10' straightedge requirements are:

1. Shoulder areas
2. Parking lots
3. Ramps, Streets, or Acceleration / Deceleration lanes less than 1000' in length.

Submission Requirements:

Test results must be submitted to the Engineer within five working days of completion of testing. Results not received within the allotted time frame will be assessed a charge of \$1,000.00 per day at the discretion of the Engineer.

The Contractor is required to submit summary table IRI reports from their test equipment for 1 run for each lane and direction of paving. This report must also include:

1. Profiling Company Name
2. Date of Test
3. Contract Number
4. Location Description
5. Testing Personnel

The Contractor is required to submit ERD files for each of the 3 tests run in each lane and direction of paving to the Engineer for analysis. The Contractor must provide to the Engineer written documentation indicating the start and end of bridges and the center of obstructions relative to the stationing used on the testing that are not subject to IRI analysis.

Acceptance and Payment:

Acceptance of the final pavement will be based on Engineer calculated IRI values using ProVAL software upon removal of allowable areas of exemption and the number of deviations found in the pavement surface. The IRI measurements will be calculated in 0.1 mile (528 foot) sections for payment purposes. The average value of the three test runs will be used and the average value will be rounded to the nearest tenth. Payments for each section will be based on estimated tonnage calculated from plan thickness and widths using the average maximum specific gravity ("Rice") for all surface mix used at that location.

Deviations equal to or in excess of 0.25" in 10' are to be corrected at the Contractor's expense or will have a discount charge of \$200.00 per deviation.

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

Where: L = Length Segment (ft.)

W = Lane Width (ft.)

T = Plan Thickness (in.)

$$\text{IRI Incentive / Disincentive} = \text{Estimated Tonnage} * \text{UP} * (\text{PA}-100)/100$$

Where: UP = Contract Unit Price (Dollars)

PA = Pay Adjustment (Table A)

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

$$(\sum \text{IRI adj for each section}) - \text{Total Deviations} * 200$$

It is possible to receive incentive for IRI measurements and a discount charge for excessive deviations on the same project. If a 528' section has an IRI value resulting in a deduction of at least 84% of the section pay, the deviation discount charge for that section is disregarded and the IRI discount charge is the only action taken for that section.

Table A: Payment Adjustments for IRI	
Class 1	
IRI per 0.1 mile Segment (in./mi.)	Pay Adjustment
≤ 50	103%
> 50 and < 145	100+ 0.2(65- IRI)
≥ 145	84%

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Class 2	
IRI per 0.1 mile Segment (in./mi.)	Pay Adjustment
≤ 60	106%
> 60 and < 170	100+ 0.2(90- IRI)
≥ 170	84%

Correction to the paving surface, such as diamond grinding with approved equipment, patching, or other measures may be taken at the Contractor's expense and at the Engineers discretion to correct pavement surfaces assessed a discount charge. The Engineer may require corrective actions including remove & replace if the deviation discount charge exceeds 50% of the cost of materials or the IRI pay adjustment is 84%. Deviations must be corrected if it is determined that they are at a height or depth that may create a safety concern.

4/10/2019

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description

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

.02 Bituminous Concrete Production – Quality Acceptance

(a) Material Production - Tests and Evaluations.

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

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

The first sample of the production day will be randomly generated by the Engineer between loads 0 and 12 (0-250 tons). Subsequent samples will be randomly generated by the Engineer on 500-ton sub-lots for the production day. Samples not retrieved in accordance with the Contractor's QC plan will be deemed unacceptable and may be a basis for rejection of material produced. Parallel tests or dispute resolution tests will only be performed on material captured at the same time and location as the acceptance test sample. Parallel test samples

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or Dispute Resolution samples will be created by splitting a large sample or obtaining multiple samples that equally represent the material. The Engineer will perform all splitting and handling of material after it is obtained by the Contractor.

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

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

The target size of sub-lots within each lot, except for the first sample of the production day, is equal-sized 500 ton sub lots and will be based upon anticipated production, however, more or fewer sublots, with differing sizes, may result due to the production schedule and conditions. If the actual production is less than anticipated, and it's determined a sample will not be obtained (based upon the anticipated tonnage), a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. If the actual production is going to be 50 tons or greater over the anticipated sub lot production, a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. The Engineer will combine the evaluation and test results for all of the applicable sublots in order to evaluate each individual lot.

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

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

- AASHTO T312 - Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens

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- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

(b) Pavement Construction - Tests and Evaluations.

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

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

The exempt areas around manholes will be a maximum of 4 feet transversely on either side from the center of the manhole, and 20 feet longitudinally on either side from the center of the manhole. The exempt areas around driveway entrances shall be the entire width of the driveway, and 3 feet from the edge of the longitudinal joint next to the driveway. Areas of exemption that will be cored for informational purposes only include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.08 in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status.

The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.02 Acceptance Plan (a) Material Production - B Tests and Evaluation** and analyzing the compaction results over the individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

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

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

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

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

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

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

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

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

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

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

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

.03 Payment and Pay Adjustment Factors.

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

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

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

(a) Material Production - Pay Adjustment.

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

Table 2 - Material Parameter Weight Factors		
Material Parameter	Single Test Tolerance (+/-)	Weight Factor
Asphalt Content	0.4	0.30
#8 Sieve (>=19.0 mm)	7.0	0.30
#8 Sieve (<=12.5 mm)	5.0	0.30
#200 Sieve (0.075mm Sieve)	2.0	0.30
Air Voids (4.0% Target)	2.0	0.10

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

1. For each parameter, calculate the mean value and the standard deviation of the test values for the lot to the nearest 0.1 unit.
2. For each parameter, calculate the Upper Quality Index (QU):
$$QU = ((JMF \text{ target}) + (\text{single test tolerance}) - (\text{mean value})) / (\text{standard deviation}).$$
3. For each parameter, calculate the Lower Quality Index (QL):
$$QL = ((\text{mean value}) - (JMF \text{ target}) + (\text{single test tolerance})) / (\text{standard deviation}).$$
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 3 - Quality Level Analysis by the Standard Deviation Method. (Use the column for "n" representing the number of sublots in the lot. Use the closest value on the table when the exact value is not listed).
5. Calculate the PWL for each parameter from the values located in the previous step:
$$PWL = PU + PL - 100.$$

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6. Calculate each parameter's contribution to the payment adjustment by multiplying its PWL by the weight factor shown in Table 2 for that parameter.
7. Add the calculated adjustments of all the parameters together to determine the Composite PWL for the lot.
8. From Table 4, locate the value of the Pay Adjustment Factor corresponding to the calculated PWL. When all properties of a single test are within the single test tolerance of Table 2, Pay Adjustment factors shall be determined by Column B. When any property of a single test is outside of the Single Test Tolerance parameters defined in Table 2, the Material Pay Adjustment factor shall be determined by Column C.
9. For each lot, determine the final material price adjustment:

Final Material Pay Adjustment =

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

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

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

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

If, during production, a QA sample test result does not meet the acceptable tolerances and the Contractors QC sample duplicates the QA sample test result, the Contractor can make an appropriate change to the mixture (within the JMF boundaries), and request to have that sample further isolated. After the Contractor has made appropriate changes, the Contractor will visually inspect each produced load. The first visually acceptable load will

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be sampled and tested. If that sample test result shows compliance with the specifications, the material that is considered out of the acceptable tolerance will include the material from the previous acceptable test result to the third load after the initially sampled and tested sample. If the sample does not meet the specification requirements, the Engineer will no longer accept material. Production may resume when changes have been made and an acceptable sample and test result is obtained.

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

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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

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69	0.65	0.57	0.54	0.53	0.52	0.52	0.51
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32

Table 3 B Quality Level Analysis by the Standard Deviation Method

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

Table 4 - PWL Pay Adjustment Factors		
PWL	Pay Adjustment Factor (%) Column B	Pay Adjustment Factor (%) Column C
100	+5	0
99	+4	-1
98	+3	-2
97	+2	-3
96	+1	-4
95	0	-5
94	-1	-6
93	-2	-7
92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

(b) Pavement Construction - Pay Adjustments.

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

- Degree of compaction of the in-place material

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

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1. Calculate the core bulk specific gravity values from the subplot tests values, to the nearest 0.001 unit. Obtain the Theoretical maximum Specific Gravity values from the corresponding laboratory subplot tests.
2. Calculate the Degree of Compaction:
 Degree of Compaction =

$$\left(\frac{\text{Core Bulk Specific Gravity}}{\text{Theoretical Maximum Specific Gravity}} \right) \times 100\%$$
 recorded to the nearest 0.1%.
3. The average compaction for the sublots shall be averaged together for the compaction level of the lot. The lots compaction test level shall be averaged and recorded to the nearest whole percent.
4. Locate the value of the Payment Adjustment Factor corresponding to the calculated degree of compaction from Table 5 or Table 5a.
5. Determine the pavement construction price adjustment by using the following formula:

$$\text{Construction Pay adjustment} = (\text{Lot Quantity}) \times (\text{Bid Price}) \times (\text{Pay Adjustment Factor}) \times 30\%.$$

Table 5: Compaction Price Adjustment Highway Locations		
Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3
93.0	92.75 – 93.25	5
92.5	92.26 – 92.74	3
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	-5
90.5	90.26 – 90.74	-15
90.0	89.75 – 90.25	-20
89.5	89.26 – 89.74	-25

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89.0	88.75 – 89.25	-30
88.5	88.26 – 88.74	-50
=<88.0	=<88.25	-100*

* or remove and replace it at Engineer's discretion

Table 5A: Compaction Price Adjustment Other¹ Locations

Degree of Compaction	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1
88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5
87.5	87.26 – 87.74	-10
87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30
85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
=< 84.0	=<84.25	-100*

* or remove and replace at Engineer's discretion

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

.04 Dispute Resolution.

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

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

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

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

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

If there is a discrepancy between the Engineer's acceptance test result and the Contractor's test result, the Contractor may ask for the Dispute Resolution sample to be tested. The Contractor may request up to two dispute resolution samples be tested per calendar year without charge. Any additional Dispute Resolution samples run at the Contractors request where the results substantiate the acceptance test result will be assessed a fee of \$125. Any additional Dispute Resolution samples that substantiate the Contractors test result will not be assessed the fee.

When disputes over compaction core test results occur, the Engineer's acceptance core will be used for the dispute resolution sample. The Contractor will be advised on when the testing will occur as referenced above to witness the testing. The results of the dispute resolution testing shall replace all of the applicable disputed test results for payment purposes.

Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement

Description.

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

Materials and Equipment.

The following material shall be available to complete this work:

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

The following equipment shall be available to complete this work:

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

Construction Method.

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

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

Performance Requirements.

The Engineer will judge the patch on the following basis:

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

Basis of Payment.

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

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

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

1. Contact Materials & Research (M&R) personnel to determine if information about the area is already available. If M&R has already obtained cores in the location that is being investigated, the contractor may opt to use the laboratory information for the investigation and not core the area on their own.
2. If M&R does not have information concerning the section of the roadway, the contractor needs to contact M&R to arrange for verification of coring operations. Arrangements shall be made to allow for an individual from M&R to be on the site when the cores are obtained. Cores will be turned over to M&R for evaluation.
3. The Contractor is responsible for providing all traffic control and repairing core holes in accordance to 401699 Appendix A - Repairing Core Holes in Bituminous Asphalt Pavements.
4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.

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5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.
6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.
7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

Structural Number Calculations

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

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

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

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

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

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

Example:

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

Calculation:

For the Type B lift the calculation would be:

Existing HMA	2 * 0.32	=	0.64
GABC	7 * 0.14	=	0.98
			<u>1.62</u>

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For the Type C lift the calculation would be:

Newly Placed B	$2.25 * 0.4$	=	0.90
Existing HMA	$2 * 0.32$	=	0.64
GABC	$7 * 0.14$	=	0.98
			<u>2.52</u>

11/3/14

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501524 - FURNISHING PORTLAND CEMENT CONCRETE OVERLAY

501525 - CONSTRUCTING PORTLAND CEMENT CONCRETE OVERLAY

Description:

This item shall consist of furnishing all materials and placing an accelerated strength Portland cement concrete overlay on a prepared bituminous surface. The overlay shall be in accordance with the lines, grades, and dimensions as shown on the plans or as directed by the Engineer. All requirements of Section 501 shall be applicable except as modified herein.

Materials:

Portland Cement. Portland Cement shall conform to the requirements of Section 1020.

Water. Water used shall conform to the requirements of Section 1021.

Fine Aggregate. Fine Aggregate shall conform to the requirements of Section 1003.

Coarse Aggregate. Coarse Aggregate shall conform to the requirements of Section 1022. If the overlay is less than 4 inches deep, Delaware #8 stone, conforming to Section 1004, shall be utilized. The contractor has the option of using #57, #67, or a combination of both coarse aggregates for the overlay if greater than 4 inches deep.

Air Entraining Agent. Air entraining agent shall conform to the requirements of AASHTO M154.

Chemical Admixtures. If a high range water-reducing admixture is utilized, it shall conform to the requirements of AASHTO M194, Type F or Type G.

Accelerators. If chemical accelerators are utilized, they shall be non-chloride based.

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

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Curing Materials. Liquid membrane curing compounds shall conform to the requirements of AASHTO M148, for Type 2, Class A or B white-pigmented liquid curing compound.

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

Concrete Mixture Design:

Place Class A concrete having a minimum compressive strength of 2,000 pounds per square inch (or as noted in the Contract Documents) in 6 hours as measured by Sure-Cure Mold test cylinders. Use Sure-Cure Mold test cylinders and all associated Equipment provided by the Contractor. The concrete will be sampled and tested by the Engineer. The Engineer may also use the concrete maturity meter in accordance with AASHTO T 325 to determine compressive strength. Include Material in the concrete to mitigate alkali-silica reactivity (ASR) as per Section 1022. The Contractor shall submit a concrete mix design to include the following parameters:

CONCRETE PROPERTY	SPECIFICATION
Water/Cementitious Material Ratio	0.40 (maximum)
Air Content (%)	4 - 7
Slump*	2 - 5 inch
Synthetic Fibers **	1.5 pounds per cubic yard minimum or as per manufacturer's recommendation

*Slump may be increased up to 8 inches if a Type F Admixture is utilized. Use only non-chloride based admixture Materials.

** Use synthetic fibers that are alkali-resistant polypropylene, polyethylene, or nylon with a minimum length of ½ inch meeting the requirements of ASTM C1116, Type III.

Construction Methods:

Surface Preparation:

Prior to the placement of the concrete, completely clean the milled asphalt pavement surface to remove any deleterious material. The prepared surface shall be kept clean and free of debris and deleterious materials by the use of protective covers. The overlay shall not be placed if the surface of the milled surface is greater than 90oF. Immediately prior to beginning placement of concrete, the surface shall be dampened but not flooded with water.

Placing and Consolidating the Concrete:

The concrete shall be placed according to the requirements of Subsection 501.03.2.2. The concrete shall be deposited directly on the milled asphalt pavement surface and shall be uniformly distributed and spread full-depth over the entire milled asphalt pavement surface to the specified width. The concrete shall be consolidated with an internal vibrator, particularly near the edges, corners, tie-bars, and around the dowels where used. The vibrator must be capable of visibly affecting the concrete from a distance of 1 foot from the vibrator head. Screeding shall be done so as to minimize handwork behind the screed. The transverse finish of the concrete pavement surface shall be as specified in Subsection 501.03.4.

Curing the Concrete:

White Membrane Curing Compound

1. Spray the curing Material on the pavement surface and all exposed edges immediately following the texturing operation.
2. Continuously agitate the curing Material during application to keep it thoroughly mixed.
3. Uniformly apply 2 applications of spray to the entire surface at a rate covering no more than 200 square feet (22.2 square yards) per gallon per each of the 2 applications. Apply the first coat immediately following the tining operation and the second coat no more than 30 minutes after the first.
4. If necessary, use hand sprayers for pavement edges or small and irregular areas inaccessible to the larger mechanical applicator. The rate of application remains no more than 200 square feet per gallon per each of the 2 applications.
5. No Equipment or traffic (other than joint saws and foot traffic) is permitted on the pavement until the compressive strength has reached at least 2,000 pounds per square inch.

Joints:

A. Transverse Sawed Joints

1. Saw the joints at the specified spacing to a depth of $T/3 + 1/4$ inch (T = Pavement Thickness) and a width of $1/8$ inch.
2. Begin joint sawing as soon as the concrete can support the saw and operator with no damage to the pavement surface.
3. Time the sawing so that the concrete does not ravel behind the blade and so that random cracking does not occur.
4. Determine the timing of the saw cutting based on weather, temperature, and his/her judgment. Center the saw cuts over the load transfer dowels. Following transverse saw cutting, provide crack-free pavement except for the cracks under the designed saw cut joints.

B. Longitudinal Sawed Joints

1. Following the transverse joint saw cutting, perform longitudinal saw cutting on pavement placed in multi-lane (or lane and shoulder) pulls. Saw the joints to a depth of $T/3 + 1/4$ inch and to a width of $1/8$ inch.
2. Determine the timing of the saw cutting based on weather, temperature, and his/her judgment. Center the saw cuts over the tie-bars. Following longitudinal saw cutting, provide crack-free pavement except for the cracks under the designed saw cut joints.

C. Transverse Construction Joints

1. Construct this joint at the end of a day's paving run.
2. Prior to beginning paving operations, provide a formed bulkhead for use in an emergency necessitating a non-planned paving stoppage exceeding 30 minutes.

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3. Submit for approval the proposed method of building the transverse construction joint. The resulting joint must create a vertical face perpendicular to the pavement conforming to the designed cross slope having load transfer dowels spaced the same as the load transfer devices. Finish the top edge with a 1/4 inch rounded edging tool. If the proposed construction method involves drilling and grouting load transfer dowels, they must be of the same Material and dimensions as those provided as part of the load transfer devices. Drilling and grouting procedures and related Materials must accompany the submission, if applicable. Provide a grout retainer ring if dowels will be installed by drilling and grouting.
4. When placing concrete pavement abutting the transverse construction joint, use a 1/4 inch rounded edging tool to finish the top edge of the concrete in contact with the previously constructed joint. If tying into a non-rounded edge of existing pavement, saw cut a 1/4 inch bevel on the existing pavement edge prior to placing the new adjoining concrete pavement.

D. Longitudinal Construction Joints

1. Construct these joints directly over Hook Bolts or W-Bolts installed in a previously placed run of pavement. If tying into concrete placed under a previous contract, drill and grout tie-bars (#5 rebar) into the existing concrete pavement if so noted in the Contract Documents.

2. Form the joint by finishing the concrete abutting the existing concrete with a 1/4 inch rounded edging tool. If tying into a non-rounded edge of existing pavement, saw cut a 1/4 inch bevel on the existing pavement edge prior to placing the new adjoining concrete pavement.

E. Unless detailed otherwise in the Contract Documents, no joint sealant Material is required in any of the joints covered in this Section.

Opening to Traffic:

No traffic shall be allowed on the pavement until the concrete has attained a compressive strength of 2,000 psi or as directed by the Engineer. Also, the Engineer will sound the entire pavement to ensure proper consolidation of the overlay. Any areas determined to be unacceptable shall be removed and replaced by the Contractor at no cost to the Department.

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The Engineer may test for excessive deviations with a straightedge, a California-type profilometer, or other surface measuring devices. When tested with a straightedge, excessive deviations are surface deviations greater than 1/8 inch from a reference line between points not greater than 10 feet apart along the direction of traffic. When tested with a profilograph, excessive deviations are surface deviations greater than 0.3 inch above or below a reference line between points not greater than 25 feet apart along the direction of traffic, when the pavement will not be diamond ground end-to-end after patching. When the pavement will be diamond ground end-to-end after overlay, excessive deviations are defined as surface deviations greater than 0.4 inch above or below a reference line between points not greater than 25 feet apart along the direction of traffic and less than 0.3 inch after grinding. The Contractor shall correct unacceptable deviations in the overlay areas before starting the end-to-end grinding

Method of Measurement:

The quantity of "Furnishing Portland Cement Concrete Overlay" will be measured by the cubic yard as determined from the theoretical yield of the design mix and documented by the batching records. Material wasted, rejected, or otherwise to be furnished at no cost to the Department will not be paid. The quantity of "Constructing Portland Cement Concrete Overlay" will be measured by the square yard, regardless of the depth of the placed mixture. The actual area completed and accepted by the Engineer will be measured.

Basis of Payment:

The quantity of "Furnishing Portland Cement Concrete Overlay" will be paid for at the Contract unit price per cubic yard. Price and Payment will constitute full compensation for supplying, mixing, and hauling acceptable overlay material to the jobsite and for all labor, equipment, tools and incidentals required to complete the work. The quantity of "Constructing Portland Cement Concrete Overlay" will be paid for at the Contract unit price per square yard. Price and Payment will constitute full compensation for the preparation of the areas; and placing, finishing, texturing, sawing, and curing the overlay and for all labor, equipment, tools and incidentals to complete the work.

6/18/19

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503543 - NIGHTTIME P.C.C. PATCHING SURCHARGE, NEW CASTLE COUNTY

503544 - NIGHTTIME P.C.C. PATCHING SURCHARGE, KENT COUNTY

503545 - NIGHTTIME P.C.C. PATCHING SURCHARGE, SUSSEX COUNTY

Description:

The item(s) Nighttime P.C.C. Paving Surcharge consist of compensating the Contractor for the cost differential for nighttime P.C.C. patching when such work is directed by the Department to be performed outside the Contractor's normal working hours. For the purpose of these items, the normal work hours are considered to be from 7 a.m. to 5 p.m.

All requirements of Section 503 shall be applicable to these items except as modified herein and in the P.C.C. Patching Special Provisions.

Method of Measurement:

The Contractor will be paid an additional amount per square yard as a surcharge over the Contract unit price bid for each type of P.C.C. patching items to be used including paving surcharge for that particular zone.

Basis of Payment:

The payment for the item will be made at the Contract unit price per square yard bid for the item "Nighttime P.C.C. Patching Surcharge" for the applicable Zones in the Contract, which price will be full compensation. All costs such as, but not limited to, illumination and premium pay costs shall be incidental to these items.

4/07/17

601501 - SPRAY APPLIED STRUCTURAL LINER FOR PIPES

Description:

A. Furnish and place spray applied structural liner for the rehabilitation of existing pipes using factory blended cementitious material. The system must be able to support all applicable design loads assuming that the existing corrugated metal pipe carries no load and must provide a minimum 50 year service life for durability.

Materials:

A. Provide repair mortar materials per Table 1 and pipe liner mortar materials per Table 2. In addition, pipe liner material must have less than 10% fly ash, must include nonmetallic fibers, and must include admixtures to enhance autogenous healing.

Table 1. Repair Mortar Requirements			
Property	Test Method	Duration	Requirement
Set Time @ 70F	ASTM C403	Initial Set	150 minutes
		Final Set	240 minutes
Flexural Strength	ASTM C293	28 Days	Min. 1,500 psi
Compressive Strength	ASTM C109	1 Day	Min. 5,000 psi
		28 Days	Min. 11,500 psi
Modulus of Elasticity	ASTM C469	28 Days	Min. 3,480,000 psi
Tensile Strength	ASTM C496	28 Days	Min. 700 psi
Shear Bond Strength	ASTM C882	28 Days	Min. 1,700 psi
Freeze Thaw	ASTM C666	300 Cycles	Pass (<1% loss)

Table 2. Pipe Liner Mortar Requirements			
Property	Test Method	Duration	Requirement
Set Time @ 70F	ASTM C403	Initial Set	150 minutes
		Final Set	240 minutes
Flexural Strength	ASTM C293	1 Day	Min. 1,200 psi
		28 Days	Min. 1,500 psi
Compressive Strength	ASTM C109	1 Day	Min. 4,000 psi
		28 Days	Min. 8,000 psi
Modulus of Elasticity	ASTM C469	28 Days	Max. 5,260,000 psi
Residual Flexural Strength @ L/300	ASTM C1609	28 Days	Min. 500 psi
Tensile Strength	ASTM C496	28 Days	Min. 850 psi
Shear Bond Strength	ASTM C882	28 Days	Min. 2,900 psi
Chloride Ion Penetration	ASTM C1202	---	Max. 50 Coulombs
Freeze Thaw	ASTM C666	300 Cycles	Pass (<1% loss)

Construction:

A. Submittals. Submit the following items for approval:

1. Contractor qualifications showing at least five (5) years of experience performing the proposed work. Include at least three (3) references with the qualifications.

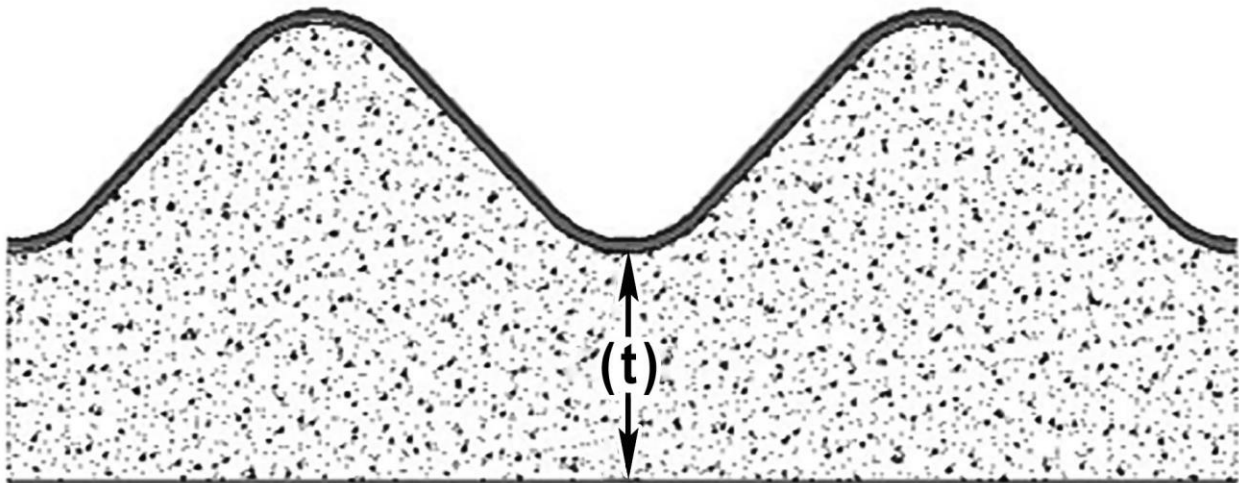
2. Design calculations sealed by a Professional Engineer registered in the State of Delaware.

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- a. Design the structural spray liner rehabilitation system in accordance with the edition of the AASHTO LRFD Bridge Design Specifications specified in the Contract Documents. For design procedures not covered by AASHTO LRFD Bridge Design Specifications, provide an engineering design guide which is corroborated by a finite element analysis verifying the design method. Use the following variables for design of the structural spray applied liners:

Table 3. Structural Liner Design Variables		
Variable	Value	Units
Groundwater Height	Top of pipe unless otherwise noted on the plans	ft
Poisson's Ratio	0.3	N/A
Lateral Earth Pressure Ratio	0.45	N/A
Soil Density	120 minimum	lb/cf
Soil Modulus of Reaction	2,000 maximum	psi
Long Term Material Modulus	100% of short term material modulus	psi
Crack Width	0.01 maximum	inches
Live Load	HL-93	psi
Thickness (t)	2.0 min (See Figure 1)	inches

Figure 1. Minimum Cover over Corrugations:



3. A work plan which must include the following:
 - a. Methods of cleaning and surface preparation of the existing corrugated metal pipe.
 - b. Repair methods for the existing corrugated metal pipes with areas of 100% section loss.
 - c. Handling and storage conditions of material.
 - d. Batch quality control plan.
 - e. Site specific health and safety plan.
 - f. Installation procedures including methods to verify applied thickness during installation.
 - g. Video survey of existing pipes less than 48" in diameter before installation.
4. Batch materials to perform product qualification testing by the Department. Allow 30 days for review and verification testing.
5. During construction, submit the following information to the Engineer:
 - a. Test results performed that demonstrate the liner material meets the material requirements. Perform the tests on specimens prepared at the project site.
 - b. Daily thickness measurements of the spray material.
 - c. Temperature and humidity readings in the existing pipe.

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- B. *Shipment and Storage.* Follow the approved work plan for shipment and storage of all materials. Ensure the material safety data sheets accompany the materials. Do not use material from defective, punctured, or damaged containers. Ensure that each container is labelled with a batch or lot number and with an expiration or use-by date.
- C. *Preparation.* Dewater the work area as shown in the contract. Remove all debris and obstructions from the existing pipe. Clean and prepare the surface of the existing pipe in accordance with the approved installation procedures. Patch holes and gaps in the existing pipe with the repair mortar to provide a solid continuous surface on which to spray. Existing pipe must be free from standing water and water intrusion before beginning installation.
- D. *Installation.* For pipes with an inner dimension greater than 48 inches, install visual thickness indicators in sets of three for every 10 linear feet of pipe. For pipes with an inner dimension greater than 84 inches, install visual thickness indicators in sets of four for every 10 linear feet of pipe.

Control the temperature and humidity within the existing pipe according to the approved work plan.

Protect walls, surfaces, streambed, and plants from overspray at the entrance and exit of the existing corrugated metal pipe. Apply the liner material using a high speed bi-directional centrifugal spin-caster to provide a uniform surface and thickness. Troweling the liner material is prohibited. Apply additional material to any areas found to be less than the design thickness. Ensure the liner is continuous over the length of the existing corrugated metal pipe and free from defects such as foreign inclusions, holes, and cracks larger than 0.01 inches wide. Ensure the sprayed liner is impervious to infiltration and exfiltration.

Contain, collect, characterize, and legally dispose of all waste generated during the work.

Record the batch or lot number from the containers used each day.

Table 4. Acceptance of Work.				
Property	Test Method	Duration	Requirement	Frequency
Flexural Strength	ASTM C293	1 Day 28 Days	Min. 1,200 psi Min. 1,500 psi	Daily
Compressive Strength	ASTM C109	1 Day 28 Days	Min. 4,000 psi Min. 8,000 psi	Daily
Residual Flexural Strength @ L/300	ASTM C1609	28 Days	Min. 500 psi	Daily
Tensile Strength	ASTM C496	28 Days	Min. 850 psi	Daily
Chloride Ion Penetration	ASTM C1202	---	Max. 50 Coulombs	Once per lot number
Thickness	Visual Indicators	---	90% minimum of indicators greater than design thickness	Once

All sampling and testing to be performed by the engineer. Sampling frequency to be performed once per day with additional testing at the engineer's discretion.

E. Post-Installation. Repair all defects in the liner as directed by the engineer at no cost to the Department. Perform a post-installation video survey for all pipes with a diameter less than 48 inches and provide a copy of the video to the engineer. Pipes 48" in diameter and larger will be visually inspected by the Department.

F. Acceptance. Acceptance will be determined after receipt and approval of the pipe video for pipes smaller than 48" in diameter and a visual inspection for pipes 48" in diameter and greater. See Table 4 for additional acceptance criteria.

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Method of Measurement:

A. The quantity of spray applied structural liner for pipes will be measured as the actual number of linear feet of liner placed and accepted measured from end to end parallel to the flowline of the corrugated metal pipe.

Basis of Payment:

A. The Department will pay for accepted quantities at the Contract Unit Price as follows:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
601501	SPRAY APPLIED STRUCTURAL LINER FOR PIPES	LF

B. The quantity of spray applied structural liner for pipes will be paid for at the contract unit price per linear foot. Price and payment will constitute full compensation for preparing submittals, furnishing equipment and water, disposing of removed material, preparing and repairing the corrugated metal pipe, installing the liner, pipe videoing, and for all labor, equipment, tools, and incidentals to complete the work.

4/9/2019

601503 - CLEANING BRIDGE SCUPPERS

Description:

This work consists of furnishing proper equipment and cleaning the existing bridge scuppers and downspouts in accordance with the notes and locations on the Plans as directed by the Engineer.

Construction Methods:

The Contractor shall remove sediment, debris, etc., from the box of the scupper and pipe outfalls. Once this blockage has been removed, the Contractor shall rout, if required, and flush downspouts with water under pressure to remove any obstructions and cleanse the system. Routing and flushing equipment shall be industry accepted equipment for this type of cleaning and flushing operation.

Method of Measurement:

The quantity scuppers cleaned will be measured as the actual number of each scupper cleaned and accepted.

Basis of Payment:

The quantity of scuppers cleaned will be paid for at the Contract unit price per each. Price and payment shall constitute full compensation for cleaning, routing and flushing in pipe from scupper to pipe discharge, disposal of removed materials, for all labor, tools, equipment and necessary incidentals to complete the work.

8/15/17

616500 - MOISTURE CURED URETHANE PAINT SYSTEM (RECOATING)

616501 - MOISTURE CURED URETHANE PAINT SYSTEM (RECOATING, S.F.)

Description:

The items shall consist of recoating a portion or the entire existing steel structure as specifically indicated on the Plans.

Material:

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

Primer

Generic Type: Zinc - rich, single-component, moisture-cured urethane

Vehicle Type: Moisture-cured urethane

Volume of Solids: 60% Minimum

Pigment Type: 3.5 lbs/gal. Zinc dust

Pigment Content: 75% min. (ASTM D2371)

Zinc Iron Oxide

Content in Dry Film

by Wt (ASTM D521): 83% Minimum

Zinc Dust Particle

Size (Ave.): 3-5 microns

Coverage: 3 mils DFT minimum

Isocyanate Content: 8.7% min. to 10.3% max.

VOC: Not to exceed 2.8 lbs/gal

Weight Per Gallon: Minimum 22 lbs/gal

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Intermediate Coat

Generic Type: Micaceous Iron Oxide-filled, single-component, moisture cured polyurethane
Vehicle Type: Moisture-cured polyurethane
Volume Solids: 60% minimum
Solids by Wt.: 79% ± 2.0 min.
Pigment Type: 4.0 lbs/gal. Micaceous Iron Oxide Tinted to distinguish from primer and topcoat
Color: Tinted to distinguish from primer and topcoat
Coverage: 3 mils DFT minimum
VOC: Not to exceed 2.8 lbs/gal
Weight Per Gallon: Minimum 12 lbs/gal

Topcoat:

Generic Type: Micaceous Iron Oxide - filled, single-component, moisture-cured, aliphatic polyurethane
Vehicle Type: Moisture-cured polyurethane
Vehicle Solids: Minimum not > 50% of weight of solids
Volume Solids: 60% minimum
Solids by Weight: Minimum 73% ± 5% Depending on color
Pigment Type: 4.0 lbs/gal Micaceous Iron Oxide
Finish: Flat (low gloss)
Color: To be specified in the Plans
Coverage: 3 mils DFT minimum
VOC: Not to exceed 3.0 lbs/gal
Weight Per Gallon: Minimum 12 lbs.

All M.I.O. (Micaceous Iron Oxide) filled products must conform to ASTM D5532-94 standard, Type I and have a certification of its 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 paint 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 Contract Plans.

Successive time interval for coating in between prime coat, intermediate coat and finish coat shall be a minimum of four (4) and a maximum of 14 days. If the Contractor fails to complete the painting during the established period, the surface area shall be cleaned at the Contractor's expense if necessary as determined by the Engineer.

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The Contractor may use one of the following approved paint systems:

1. Wasser High-Tech Coatings, Kent, WA 98032
 - Primer: Wasser MC Zinc (spot)(3 Mil, DFT)
 - Intermediate: Wasser MC-FERROX B (3 Mil, DFT)
 - Finish: Wasser FERROX A (3 Mil, DFT)

2. Sherwin Williams
 - Primer: Corothane I - Zinc Primer @ 3 mils DFT
 - Intermediate: Corothane I - IRONOX B @ 3 mils DFT
 - Finish: Corothane I - IRONOX A @ 3 mils DFT

3. - or approved equal

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. In addition, the Contractor shall submit a one quart sample of each component of the system (primer, intermediate and finish coats) to the DelDOT Materials and Research Section 30 days prior to the start of painting. The samples submitted shall be from the paint to be used on the bridge(s) with the same batch numbers and shall be labeled with the manufacturer's name, product name, compartment part, batch number, date of manufacturer, and the bridge on which it is to be used.

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

Containers of paint shall be labeled with the manufacturer's name, product name, compartment part, batch number, date of manufacturer 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, unless otherwise noted on the Plans railings, fascia, downspouts, and other miscellaneous steel items that have been previously painted shall be cleaned and primed, and painted two full coats of paint, the intermediate coat and the finish coat.

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

Surfaces specified to be recoated shall be cleaned to bare metal in accordance with SSPC-SP11, Power Tool Cleaning to Bare Metal.

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 using HEPA filtered vacuums.

Surfaces shall be accepted by visual comparison to a project prepared standard. The Contractor shall prepare the project standard by power tool cleaning a representative area on the structure that is being prepared for painting. The prepared standard shall generally conform to SSPC-Vis 3, "Visual Standard for Power and Hand Tool Cleaned Steel", Pictorial Standard E SP11, F SP11, and G SP11, as applicable, and shall be approved by the Engineer before the start of general cleaning work. At least one standard shall be prepared for each structure that is being specified for cleaning. More than one standard may be necessary if the cleaned steel differs significantly from the photographic standards due to surface conditions or other factors. Each standard shall be at least 1' X 1' in size, and shall be located in an area of the structure that is accessible to, and approved by the Engineer.

The Contractor shall protect the projects standard from corrosion and contamination throughout the duration of work. Protection shall be by applying a clear coat of polyurethane, or other means. At the completion of cleaning work, the project standard shall be recleaned and painted in accordance with this 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.

The surface areas designated to be overcoated shall be solvent cleaned after water blasting.

Painting -

Manufacturer's Instructions - At least 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 Material Safety Data Sheets for the paint materials being furnished. Instructions, suggestions, and precautions contained in the 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 Steel Structures Painting Council surface preparation specifications, SSPC-SP1, Solvent Cleaning and SSPC-SP11, Power Tool Cleaning to Bare Metal;

One bound copy of the Steel Structures Painting Council pictorial standard, SSPC-Vis 3, Visual Standard for Power and Hand Tool Cleaned Steel;

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One bound copy of the Steel Structures Painting Council method SSPC-PA2, Paint Application Specification No. 2 - Measurement of Dry Film Thickness with Magnetic Gages;

One Air Thermometer, pocket type, 1-200F;

One Surface Thermometer, 0-300F; and

One Magnetic Dry Film Thickness Gage, Type 2 (fixed probe);

Atmospheric Conditions - Painting shall not be performed unless all 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 painting work to be performed when the surface and ambient temperatures are less than 35F or greater than 100F.

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 with manufacturer's recommendations and state VOC regulations. Unauthorized use of solvents shall result in recleaning and repainting of 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, unless prohibited by the contract documents. When spray painting is prohibited, paint shall be applied using brushes or rollers only.

Stripe painting 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 prime coat is applied. All stripe painting will be performed using a brush only. No other method of paint application 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 or other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

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Number of Coats - Areas cleaned to bare metal and specified the item Recoating shall be painted with one coat of primer. After the primer has dried, all surfaces shall be painted with two full coats of paint, the intermediate and the finish coat.

The bridge bearings that have received a coating of anti-corrosive grease shall receive a coat of finish paint from the 3rd coat of paint from the 3 coat system. The purpose is to blend the grease color with the structural steel being painted. Care shall be taken not to apply too much paint onto the bridge bearings and bottom flanges of the girders when painting the grease in order to avoid "mudcracking" of the paint system of the structural steel.

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

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 recleaning 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 previous coating (primer), or within the manufacturer's recommended schedule for recoating, whichever is less.

The finish paint shall be applied to the receiving surface within 14 days of the application of the previous coating (intermediate), or within the manufacturer's recommended schedule for recoating, whichever is less.

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 recleaning and repainting the surface. The work of recleaning 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 (NLGI Grade 2, either Mobile Centaur Moly Grease, Shell Rhodina SDX 2 Grease or approved equal) 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 providing that the bearing for other areas that are designated to receive the grease have already been cleaned and painted.

Material Storage - Paint in storage shall be protected from damage and maintained between 40F and 85F. Paint not used before the expiration shall be immediately removed from the project site.

Painting of Galvanized Steel -

All galvanized surfaces (downspouts, etc.) shall be painted with a moisture cure aluminum paint that is designed to adhere to galvanized steel surfaces. The moisture cure aluminum paint must follow the following requirements:

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1 coat system

Generic type: Aluminum filled aromatic moisture cure urethane
Vehicle type: Moisture cured aromatic polyurethane
Pigment type: Minimum 2 lbs/gal non-leafing aluminum
Coverage: 2 mils D.F.T. minimum
VOC: Not to exceed 3.5 lbs/gal
Weight per gallon: 9.2 lbs/gal
Solids by volume: 52.0 ± 1.0%
Shelf life: 6 months from date of shipment, in unopen original containers stored at temperatures below 86F.

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-inch numbers. The paint used for this marking 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 end of the structure, on a location designated by the Engineer. The Contractor shall paint the month and year of the existing stenciling after the existing stenciling area is cleaned and painted if so required in case of partial painting of the structure.

Method of Measurement:

Payment shall be made at the lump sum price bid and/or square foot basis as applicable to the Contract item(s).

Basis of Payment:

The payment for the item(s) shall be made at the contract unit price bid per Lump Sum for items 616500 and per Square Foot for item 616501, which constitutes 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 the percentage of the structure primed and painted two full coats of paint in accordance with the specification. The percentage shall be computed as the ratio of the length of structure primed to the total length of structure. The percentage of payments to be paid to the Contractor shall be 25%, 50%, 75%, and 100% after the completion of the job.

6/29/17

624502 –SILICONE COATED FOAM JOINT SEAL

Description:

Fabricate, furnish, and install joint seals.

Materials:

Pre-compressed silicone coated, self-expanding foam bonded to joint substrate by adhesive

Construction Methods:

1. Prior to ordering the joint Material, measure the joint opening to confirm the required size of the joint Material. If the required size conflicts with the Contract Documents, notify the Engineer immediately. Fully remove the existing seal/gland and adhesive.
2. Fully remove and dispose of the existing seal/gland and adhesive.
3. Strictly follow the manufacturer's written recommendations and installation procedures for preparing the surface of the concrete/steel substrates prior to receiving the joint Material and for installing the joint Material. Use the manufacturer's recommended bonding agent.

Method of Measurement:

The quantity of joints will be measured as the number of linear feet of joints fabricated, installed, and accepted.

Basis of Payment

Price and payment for Silicone Coated Joint Seal constitutes full compensation for pre-measuring, furnishing and placing all materials, cleaning and preparing the joint as per manufacturer's recommendations, and for all labor, equipment, tools, and incidentals necessary to complete the work.

9/23/2020

628501 - THIN POLYMER OVERLAY

Description:

This work shall consist of furnishing and placing a thin polyester polymer overlay where indicated in the Contract Documents. The work shall include the preparation of receiving surfaces.

Materials:

1. Primer. The prepared surface shall receive a wax-free low odor, high molecular weight methacrylate prime coat. The prime coat shall be a resin, and prior to adding initiator the resin shall have a maximum volatile content of 30 percent, when tested in accordance with ASTM designation D 2369, and conforming to the following:

High Molecular Weight Methacrylate (HMWM) Resin		
Property	Requirement	Test Method
Viscosity* (Brookfield RVT with UL adapter, 50 RPM at 77°F)	0.025 Pa·s, maximum	ASTM D 2196
Specific Gravity* (at 77°F)	0.90, minimum	ASTM D 1475
Flash Point* (Degrees C)	10	ASTM D 3278
Vapor Pressure* (mm Hg at 77°F)	1.0	ASTM D 323
Tack Free Time (minutes at 77°F)	400 min. maximum	ASTM C 679
PCC Saturated Surface-Dry Bond Strength (MPa at 24 hrs at 70±1°F)	0.5 psi minimum	

*Tested prior to adding initiator

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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 concrete *and finishing sand* shall conform to the requirements of Section 1003, except the gradation shall meet the following:

Combined Aggregate		
Sieve Size	3/8" Max. Percent Passing	#4 Sieve Max. Percent Passing
½ "	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 T27. Fine aggregate shall consist of natural sand only.

Aggregate absorption shall not exceed one percent as determined by AASHTO Test Methods T84 and T85.

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.

Finish sand shall be a dry No. 8/20 commercial quality blast sand.

3. Polyester Binder. The polyester 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^a	Test Method
Viscosity* (RVT No. 1 Spindle, 20 RPM at 77°F)	0.075 to 0.20 Pa·s	ASTM D 2196
Specific Gravity*	1.05 to 1.10 at 77°F	ASTM 1475
Elongation	35 percent minimum Type I at 0.45"/min. Thickness = ¼" ± 0.04"	ASTM D 638
	Sample conditioning: 18/25/50 + 5/70	ASTM D 618
Tensile Strength	17.5 MPa minimum Type I at 0.45"/min. Thickness = ¼" ± 0.04"	ASTM 638
	Sample conditioning: 18/25/50 + 5/70	ASTM 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 Saturated Surface Dry Bond Strength	3.5 MPa, minimum at 24 hours and 70±1°C	

*Tested prior to adding initiator

^a Values are based on specimens or samples cured or aged at 77°F unless otherwise indicated.

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

4. Samples. Samples of materials for all components of the overlay system shall be submitted by the manufacturer to the Materials and Research Section a minimum of sixty (60) days prior to the overlay application. Samples shall be representative of the materials to be used in the overlay application and shall consist of one four-liter sample for each liquid component and a 5-pound sample for each dry component.

5. Packaging and Shipment. A Material Safety Data Sheet shall be furnished prior to use for each shipment of polyester resin binder and high molecular weight methacrylate resin. All components shall be shipped in strong, substantial containers, bearing the manufacturer'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 of the system components. If bulk resin is to be used, the Contractor shall notify the Engineer in writing 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 polyester overlay materials will be based on the following:

1. Delivery of the overlay materials to the project site in acceptable containers bearing all the label information as required in 5. Packaging and Shipment.
2. Receipt of a manufacturer's certification stating the primer, aggregate and polyester binder meet the material requirements found under MATERIALS, 1-3.
3. Approval by the Materials and Research Section based on conformance with the material requirements above.

Construction Methods:

A. General. At least ten (10) days before start of work, the Contractor shall provide the Engineer with two (2) copies of the manufacturer's written instructions for the installation of the overlay system.

The manufacturer's technical representative shall be made available for up to three (3) working days to make recommendations to facilitate the overlay installation. This shall include, but not be limited to, surface preparation, overlay application and overlay cure.

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During surface preparation and overlay application, precaution 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 Engineer.

During overlay application, the Contractor shall provide suitable coverings (e.g. heavy duty drop cloths) to protect all exposed areas not to be overlaid, such as curbs, sidewalks, parapets, etc. All damage or defacement resulting from this application shall be cleaned and, or repaired to the Engineer's satisfaction, at no additional cost.

B. Storage of Materials. All materials shall be stored in accordance with the manufacturer's recommendation to ensure their preservation until used in the work. Applicable fire codes may require special storage facilities for some components of the overlay system.

C. Equipment.

1. Surface Preparation. All equipment to be used for surface preparation shall be as specified by the overlay manufacturer 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 concrete shall be mixed in mechanically operated mixers. Mixer size shall be limited to 9 cubic feet capacity. A continuous mixer employing an auger screw/chute device may be approved by the Engineer if a demonstration shows its ability to produce a satisfactory product. 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.

3. Finishing and Texturing. Finishing shall be performed using a mechanical screed riding on preset rails. Screeds shall be approved by the Engineer prior to the application of the overlay. No vibratory screeds will be allowed.

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Texturing shall be performed using spring steel tines in accordance with Subsection 602.20.c-2, Manual Texturing.

D. Surface Preparation. All structural slab 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 1/8" or more into the base concrete, no greater than 50% of the test area. The testing shall be as per ACI 503R-93, Appendix A. The Engineer will designate the location of the test patches.

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 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. Acceptable cleaning is usually achieved by significantly changing the color of the concrete and mortar and beginning to expose coarse aggregate particles. Mortar which is sound and firmly bonded to the coarse aggregate must have open pores due to cleaning to be considered adequate for bond. Areas of asphalt larger than 1 inch in diameter, or smaller areas spaced 6 inches apart, shall be removed. Traffic paint lines shall be considered clean when the concrete has exposed aggregate showing through the paint stripe. A vacuum cleaner shall be used to remove all dust and other loose material.

If the Engineer determines that an approved cleaning practice has changed prior to the completion of the 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 overlay. Any contamination of the deck after initial cleaning shall be removed. The entire overlay system shall be applied following the cleaning and prior to opening the area to traffic.

Cleaned pavement surfaces shall not be exposed to vehicular or pedestrian traffic other than that required by the 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.

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The concrete shall be dry at the time of application of the overlay.

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 shall be at least 10°C.

The prime coat shall be uniformly applied to completely cover the surface to receive the polyester concrete. The rate of spread shall be approximately 2.3 ounces per square foot of deck surface or as recommended by the manufacturer. The prime coat shall be allowed to cure a minimum of 15 minutes before placing polyester concrete.

When magnesium phosphate concrete is placed prior to the deck overlay, the magnesium phosphate concrete shall be placed at least 72 hours prior to placing the prime coat.

When modified high alumina-based concrete is placed prior to the deck overlay, the prime coat shall not be placed on said concrete until at least 30 minutes after final set.

2. Polyester Concrete

Test Patches

Prior to constructing the overlay, one 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 12' wide, at least 6' long, and the same thickness as the overlay to be constructed. Conditions during the construction of the overlay and equipment used shall be similar to those expected and to be used for the construction of the polyester

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concrete 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 test all test areas at no additional cost to the Department until satisfactory test results are obtained.

The test patch shall have a minimum bond strength of 250 psi as determined by ACI 503R-93, Appendix A to assure that the overlay adheres to the prepared surface.

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

The polyester concrete shall be placed within 120 minutes after the prime coat has been applied. The prime coat shall be allowed to cure a minimum of 30 minutes before placing polyester concrete.

The polyester concrete shall contain approximately 12 percent polyester resin by weight of dry aggregate; the exact percentage will be determined by the Engineer during placement to enable proper finishing and texturing of the overlay surface.

The polyester overlay shall be placed at a minimum thickness of $\frac{3}{4}$ ".

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.

Expansion joints shall be adequately isolated prior to overlaying or may be sawed within four hours after overlay placement, as approved by the Engineer. The exact time of sawing will be determined by the Engineer.

The amount of initiator used in polyester concrete shall be sufficient to produce an initial set time between 30-120 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 Designation: C 266. Accelerators or inhibitors may be required to achieve proper set times and shall be used as recommended by the resin supplier.

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

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Polyester concrete shall be placed prior to gelling and within 15 minutes following addition of initiator, whichever occurs first. Polyester concrete that is not placed within this time shall be discarded.

The surface temperature of the area to receive polyester concrete shall be the same as specified above for the prime coat, a minimum of 50°F.

The finishing and texturing equipment used shall strike off the polyester concrete to the established grade and cross section. Finishing and texturing equipment shall be fitted with vibrators and tines or other means of consolidating and texturing the polyester concrete to the required compaction.

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 overlay surface shall be checked at random by the Engineer immediately after it has hardened to assure that no depressions exist that will pond water. The smoothness of the polyester concrete surface will be tested with a straightedge.

The surface shall not vary more than ¼" from the lower edge of a 12' ±0.2' long straight edge placed in any direction. Any surfaces which fail to conform the above tolerance shall be removed by grinding with an approved grinding tool.

To ensure adequate pavement friction, the completed 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 in the manner recommended by the manufacturer and approved by the Engineer.

Thickness of the overlay shall be checked prior to its initial set using a ruler. If the Engineer determines that the minimum thickness has not been attained, an additional layer shall be applied after the overlay hardens. This layer shall be a minimum of ¼" and shall be applied at no additional cost to the Department.

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

Method of Measurement:

The payment of the item "Thin Polymer Overlay" will be measured by square yard-inch of the placed mixture. The actual area finished and accepted will be measured, exclusive of the areas of metal expansion dams exposed.

Basis of Payment:

The payment of the item "Thin Polymer Overlay" shall be made at the contract price bid per square yard-inch for placing the polyester concrete overlay, which price and payment shall constitute full compensation for furnishing all labor, materials, tools, equipment, and necessary incidentals to complete the work involved in constructing the polyester concrete overlay, complete in place, including application of prime coat and furnishing, constructing and disposing of test patch overlays and base. The contract price bid shall also include the cost of having the polymer manufacturer's representative present as required.

6/28/17

Contract No. T202107401

763544 – ROAD LOCATION MOBILIZATION, ZONE 1

763545 – ROAD LOCATION MOBILIZATION, ZONE 2

763546 – ROAD LOCATION MOBILIZATION, ZONE 3

763547 – ROAD LOCATION MOBILIZATION, ZONE 4

763548 – ROAD LOCATION MOBILIZATION, ZONE 5

763549 – ROAD LOCATION MOBILIZATION, ZONE 6

763550 – ROAD LOCATION MOBILIZATION, ZONE 7

763551 – ROAD LOCATION MOBILIZATION, ZONE 8

763552 – ROAD LOCATION MOBILIZATION, ZONE 9

763553 – ROAD LOCATION MOBILIZATION, ZONE 10

763554 – ROAD LOCATION MOBILIZATION, ZONE 11

763555 – ROAD LOCATION MOBILIZATION, ZONE 12

763556 – ROAD LOCATION MOBILIZATION, ZONE 13

763557 – ROAD LOCATION MOBILIZATION, ZONE 14

Description:

This Pay Item consists of compensating the Contractor for mobilizing equipment within the mobilization zone in which the work order exists. Mobilization zone boundaries are provided in the Plans.

Method of Measurement:

One mobilization fee will be paid for each move into a mobilization zone, which shall cover all locations within that mobilization zone, on all work orders issued within that zone. A separate mobilization fee **will not** be paid for each individual location. No mobilization fee will be paid if a new work order is issued while work on a previous work order is ongoing in that zone. A separate mobilization fee will **only** be paid if the Contractor is directed by the Department to move from the mobilization zone in which he is presently working, or inclement weather causes a substantial delay in work. A substantial delay due to inclement weather shall be defined as fourteen or more calendar days. Payment of any mobilization fees shall be agreed upon between the Contractor and the Department, in writing, prior to commencement of work.

Basis of Payment:

The number of Road Location Mobilizations shall be paid at the Contract unit price per each. Price and payment shall constitute full compensation for all material, labor, equipment, tools and incidentals required to complete the work.

4/6/2020

SAMPLE AFFIDAVIT OF CRAFT TRAINING COMPLIANCE

(Actual form for signature will be provided to the awarded contractor)

AFFIDAVIT OF CRAFT TRAINING COMPLIANCE

We, the contractor, hereby certify that we and all applicable subcontractors will abide by the contractor and subcontractor craft training requirements outlined below for the duration of the contract. Craft training is defined as "an apprenticeship program approved by and registered with any State apprenticeship agency or the United States Department of Labor."¹ A list of crafts for which there are approved and registered training programs is maintained by the Delaware Department of Labor and can be found at <https://det.delawareworks.com/documents/Apprenticeship/Apprenticeship%20Occupations.pdf?20190215>. Prime Contractors are reminded they commit that all subcontractors will abide by the craft training requirements, and include the requirement in their subcontracts.

In accordance with Title 29, Chapter 69, Section 6962(d)(13) of the Delaware Code, contractors and subcontractors must provide craft training for journeyman and apprentice levels if all of the following apply:

- A. A project meets the prevailing wage requirement under Title 29, Chapter 69, Section 6960 of the Delaware Code.
- B. The contractor employs 10 or more total employees.
- C. The project is not a federal highway project

Failure to provide required craft training on the project may subject the successful contractor and/or subcontractor(s) to penalties as outlined in Title 29, Chapter 69, Section 6962(d)(13) of the Delaware Code.

Craft(s) _____

Contractor Name: _____

Contractor Address: _____

Contractor/Subcontractor Program

Registration Number _____

On this line also indicate whether DE, Other State (identify) or US Registration Number

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____, 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED.

¹ Title 29, Chapter 69, Section 6902(7) of the Delaware Code.



Delaware Department of Transportation
Quantity Sheet Summary

Proposal ID: T202107401

Project Descripton: The purpose of this contract is to initiate repairs and preventative maintenance to bridges in DelDOT

NOT TO BE USED FOR BIDDING

Item Number	Description	Unit	Quantity
207021	STRUCTURAL BACKFILL, (BORROW TYPE C)	CY	100
211001	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT, CURB AND SIDEWALK	SY	800
301001	GRADED AGGREGATE BASE COURSE, TYPE B	CY	50
302002	DELAWARE NO. 3 STONE	TON	60
302005	DELAWARE NO. 57 STONE	TON	75
610016	PORTLAND CEMENT CONCRETE MASONRY, CLASS D	CY	100
401026	BITUMINOUS CONCRETE, SUPERPAVE TYPE C, 160 GYRATIONS PG 64-22 PATCHING	TON	150
401027	BITUMINOUS CONCRETE, SUPERPAVE TYPE B, 160 GYRATIONS PG 64-22 PATCHING	TON	150
401540	NIGHTTIME PAVING SURCHARGE, NEW CASTLE COUNTY	TON	150
402000	BITUMINOUS CONCRETE PATCHING	SYIN	1500
601503	CLEANING BRIDGE SCUPPERS	EACH	20
604005	PROTECTIVE SHIELD	SF	1800
610000	PORTLAND CEMENT CONCRETE MASONRY, CLASS A	CY	25
610009	PORTLAND CEMENT CONCRETE MASONRY, CLASS B	CY	25
613002	SILANE-BASED CONCRETE DECK SEALER	SF	250000
613003	HIGH MOLECULAR WEIGHT METHACRYLATE CONCRETE SEALER	SF	20000



Delaware Department of Transportation
Quantity Sheet Summary

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NOT TO BE USED FOR BIDDING

Item Number	Description	Unit	Quantity
811001	FLAGGER, NEW CASTLE COUNTY STATE	HOUR	1000
705008	PEDESTRIAN CONNECTION, TYPE 1	SF	50
707015	RIPRAP, R-4	TON	70
707016	RIPRAP, R-5	TON	140
707017	RIPRAP, R-6	TON	110
708003	GEOTEXTILES, RIPRAP	SY	350
727006	TEMPORARY CONSTRUCTION FENCE	LF	400
760010	PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT	SYIN	1500
720030	RELOCATING GUARDRAIL	LF	150
760013	PAVEMENT MILLING, PORTLAND CEMENT CONCRETE PAVEMENT	SYIN	6100
762000	SAW CUTTING, BITUMINOUS CONCRETE	LF	900
762001	SAW CUTTING, CONCRETE, FULL DEPTH	LF	650
763000	INITIAL EXPENSE/DE-MOBILIZATION	LS	1
905001	SILT FENCE	LF	350
906002	DEWATERING BAG	EACH	6
906003	SUMP PIT	EACH	8



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Item Number	Description	Unit	Quantity
908003	TOPSOIL, 4" DEPTH	SY	550
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	550
908020	EROSION CONTROL BLANKET MULCH	SY	550
909002	SANDBAG DIVERSION	CF	725
503543	NIGHTTIME PORTLAND CEMENT CONCRETE PATCHING SURCHARGE, NEW CASTLE COUNTY	SY	50
504001	CRACK AND JOINT SEALING LESS THAN 3/4 INCH WIDE	LF	1300
504002	CRACK AND JOINT SEALING, 3/4 INCH TO 1 3/4 INCH WIDE	LF	210
601002	HEAVY CLEANING OF DRAINAGE PIPE	HOURL	50
601501	SPRAY APPLIED STRUCTURAL LINER FOR PIPES	LF	350
610019	HIGH EARLY STRENGTH CONCRETE	CY	25
611001	BAR REINFORCEMENT, EPOXY COATED	LB	3550
613004	WATERPROOFING MEMBRANE, TRAFFIC BEARING	SF	300
616501	MOISTURE CURED URETHANE PAINT SYSTEM (RECOATING, S.F.)	SF	10000
624502	SILICONE COATED FOAM JOINT SEAL	LF	1200
625000	LATEX MODIFIED CONCRETE OVERLAY INSTALLATION	SYIN	2400
625001	FURNISHING LATEX-MODIFIED CONCRETE OVERLAY	CY	80



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Item Number	Description	Unit	Quantity
628001	REPAIR OF CONCRETE STRUCTURE BY EPOXY INJECTION	LF	600
628011	CRACK SEALING BRIDGE DECKS, APPROACH SLABS, SIDEWALKS, ETC	LF	9000
628040	SHALLOW SPALL REPAIR	CF	40
628041	DEEP SPALL REPAIR	CF	1200
628042	REHABILITATION OF PORTLAND CEMENT CONCRETE MASONRY	CY	60
628501	DECK REPAIR, POLYESTER POLYMER CONCRETE	SYIN	625
701013	PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	LF	175
701014	PORTLAND CEMENT CONCRETE CURB, TYPE 2	LF	570
705002	PORTLAND CEMENT CONCRETE SIDEWALK, 6"	SF	620
705007	SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF	50
808002	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	600
809001	INSTALL TEMPORARY IMPACT ATTENUATOR	EACH	5
809005	FURNISH TEMPORARY IMPACT ATTENUATOR - NON-GATING, REDIRECTIVE, TEST LEVEL 3	EACH	5
809006	RELOCATE TEMPORARY IMPACT ATTENUATOR	EACH	5
810001	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	11000
811013	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	50



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Item Number	Description	Unit	Quantity
813001	TEMPORARY BARRICADES, TYPE III	LFDY	12000
817008	BLACKOUT TAPE, 6"	LF	3000
817009	TEMPORARY MARKINGS, TAPE, 4"	LF	6500
817010	TEMPORARY MARKINGS, TAPE, WORDS/SYMBOLS	SF	4500
817013	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	7000
817031	REMOVAL OF PAVEMENT STRIPING	SF	500
817032	REMOVAL OF PAVEMENT MARKING TAPE	SF	4500
819018	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH	50
613000	EPOXY CONCRETE SEALER	SF	2000
613001	SILICONE-BASED ACRYLIC CONCRETE SEALER	SF	8000
623004	CLEAN AND GREASE BRIDGE BEARINGS	EACH	10
624000	PREFABRICATED EXPANSION JOINT SYSTEM, 3"	LF	100
624008	CLOSED-CELL JOINT SEAL	LF	100
624009	ASPHALTIC PLUG JOINT	LF	650
624010	SILICONE JOINT SEAL, 1"	LF	1500
624011	SILICONE JOINT SEAL, 2"	LF	400



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Item Number	Description	Unit	Quantity
624014	COMPRESSION SEAL, 2"	LF	150
624015	COMPRESSION SEAL, 3"	LF	150
628050	DECK REPAIR, 1/2" TO 1" DEPTH	SF	100
628051	DECK REPAIR, 1" TO 3" DEPTH	SF	1000
628052	DECK REPAIR, 3" TO < FULL DEPTH	SF	2200
628053	DECK REPAIR, FULL DEPTH	SF	200
628070	DRILLING HOLES AND INSTALLING DOWELS	EACH	700
763544	ROAD LOCATION MOBILIZATION, ZONE 1	EACH	5
802003	ARROW PANELS TYPE C	EADY	300
803001	FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	EADY	1000
804001	FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY (FLOOD LIGHTS)	EADY	250
805001	PLASTIC DRUMS	EADY	30000
806001	TRAFFIC OFFICERS	HOUR	2000
807001	FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, UNPINNED	LF	500
807002	FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN BITUMINOUS PAVEMENT	LF	500
807003	FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY	LF	500



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Item Number	Description	Unit	Quantity
	BARRIER, PINNED IN CONCRETE		
807004	RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, UNPINNED	LF	500
807005	RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN BITUMINOUS PAVEMENT	LF	500
807006	RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	LF	500
807007	REFLECTOR PANELS	EACH	20
207000	STRUCTURAL EXCAVATION	CY	100
208000	FLOWABLE FILL	CY	50