

STATE OF DELAWARE

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DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T201109001.01

FEDERAL AID PROJECT NO. IM-N056(041)

CFDA NO. 20.205

SR 141 IMPROVEMENTS, I-95 INTERCHANGE TO JAY DRIVE

NEW CASTLE COUNTY

ADVERTISEMENT DATE: April 29, 2019

COMPLETION TIME: 943 Calendar Days

PROSPECTIVE BIDDERS ARE ADVISED THAT THERE WILL BE A MANDATORY PRE-BID MEETING THURSDAY, MAY 16, 2019 AT 10:00 A.M. IN THE DeIDOT ADMINISTRATION BUILDING, 800 BAY ROAD, DOVER, DELAWARE, 19903.

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
DELAWARE DEPARTMENT OF TRANSPORTATION
AUGUST 2016

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware prior to 2:00 P.M. local time June 4, 2019

Contract No. T201109001.01
Federal Aid Project No. IM-N056(041)

SR 141 IMPROVEMENTS, I-95 INTERCHANGE TO JAY DRIVE
NEW CASTLE COUNTY

GENERAL DESCRIPTION

LOCATION

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

DESCRIPTION

The improvements consist of furnishing all labor and materials for this project. The SR141 and I-95 interchanger, Commons Blvd. Intersection Improvements project involves roadway reconstruction activity along SR141, Commons Blvd. I-95 and I-295. Proposed improvements include, pavement widening, full depth pavement reconstruction, drainage improvements, temporary and permanent signal improvements, utility relocations, the replacement of Bridges 1-676 and 1-677 over southbound I95, and the reconstruction of six interchange ramps. proposed improvements and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION TIME

All work on this contract must be complete within 943 Calendar Days. The Contract Time includes an allowance for 145 Weather Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about August 5, 2019.

PROSPECTIVE BIDDERS NOTES:

1. BIDDERS MUST BE REGISTERED with DelDOT and request a cd of the official plans and specifications in order to submit a bid. Contact DelDOT at dot-ask@state.de.us, or (302) 760-2031. Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware prior to 2:00 P.M. local time June 4, 2019 unless changed via addendum.
2. QUESTIONS regarding this project are to be e-mailed to dot-ask@state.de.us no less than six business days prior to the bid opening date in order to receive a response. Please include T201109001.01 in the subject line. Responses to inquiries are posted on-line at <http://www.bids.delaware.gov>.
3. PREQUALIFICATION REQUIREMENT - 29 Del.C. §6962 (12)(a) requires DelDOT to include a performance-based rating system for contractors. The Performance Rating for each Contractor shall be NEW used as a prequalification to bid at the time of bid. Refer to Contract 'General Notices' for details.
4. THE BID PROPOSAL incorporates a cd containing **Expedite, version 5.9a** and its installation file. Bidders are to use the cd provided to enter their bid amounts into the Expedite file. The Expedite bid file must be printed and submitted in paper form along with the cd and other required documents prior to the Bid due date and time.
5. SURETY BOND - Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the bid.
6. DRUG TESTING - Regulation 4104; The state Office of Management and Budget has developed regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 Del.C. §6908(a)(6). **Refer to the full REVISED requirements at the following link:** http://regulations.delaware.gov/register/december2017/final/21_DE_Reg_503_12-01-17.htm

Note a few of the requirements;

- * At bid submission - Each bidder must submit with the bid a 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, *the form is attached*;
 - * At least two business days prior to contract execution - The awarded Contractor shall provide to DeIDOT 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 **DeIDOT** has approved the subcontractor in writing.
7. DBE PROGRAM REQUIREMENTS (49CFR §26.53(b)(3)(i)(B)) require submission of DBE participation information from the apparent low bidder no later than five (5) calendar days **after bid opening**.
 8. No RETAINAGE will be withheld on this contract unless through the Prequalification Requirements.
 9. EXTERNAL COMPLAINT PROCEDURE can be viewed on DeIDOT's Website [here](#), or you may request a copy by calling (302) 760-2555.
 10. AUGUST 2016 STANDARD SPECIFICATIONS apply to this contract. 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 2016 Standard Specifications can be [viewed here](#).
 - 10a. 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 contractor's 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.
 11. BREAKOUT SHEETS MUST be submitted either with your bid documents; or within seven (7) calendar days following the bid due date by the lowest apparent bidder. Refer to instructions adjacent to the Breakout Sheets in this document.
 12. PROPOSED TRAINEE PLANS - The number of trainees to be trained will be **three (3)**, as listed in the Training Special Provisions within Contract 'General Notices'. The program(s) must be submitted online at <https://deldotojt.com> as soon as possible by the apparent low bidder. Award of the Contract will not take place until acceptable On-the-Job (OJT) program plans are received and approved by the Department's Civil Rights Section.

Failure of the apparent low bidder to submit acceptable OJT Trainee Programs within ten (10) calendar days of bid opening shall create a rebuttable presumption that the bid is not responsive.
 13. SECTION 108.04 - Contractor's Resources; Progress Schedules, of the August 2016 Standard Specifications has been replaced for this project ONLY, and is contained in the Special Provisions section.
 14. CONTRACT LIQUIDATED DAMAGES are contained on the following pages.

CONTRACT LIQUIDATED DAMAGES

The contract drawings and notes provide a sequence of construction for this contract.

FAILURE TO OPEN PROJECT TO UNRESTRICTED HIGHWAY TRAFFIC ON TIME

Interim Road User costs (RUC) for delays in opening lanes along Southbound I95, Southbound I295, Northbound SR 141, and Southbound SR 141 will be enforced according to the below charts.

Table 1

Southbound SR 141 Over Southbound I-95 (Monday through Friday)		
Contractor Damages for Failure to Reopen Lanes		
Time All Lanes Reopened ("Verizon Time")	One Lane Closure	Full Closure
5:00 AM to 5:59 AM	No Damages	No Damages
6:00 AM to 6:14 AM	\$1,000	\$2,000
6:15 AM to 6:29 AM	\$1,500	\$3,000
6:30 AM to 6:44 AM	\$2,000	\$4,000
6:45 AM to 6:59 AM	\$3,000	\$5,000
7:00 AM to 7:14 AM	\$3,500	\$6,000
7:15 AM to 7:29 AM	\$4,500	\$7,000
7:30 AM to 7:44 AM	\$5,500	\$8,000
7:45 AM to 7:59 AM	\$6,500	\$9,000
Not Open by 8:00 AM	\$8,000	\$10,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
One Lane Closed	\$1,000/ 30 Minutes
Full Closure	\$1,500/ 30 Minutes

The above will be assessed for up to a total of \$25,000 per day.

CONTRACT LIQUIDATED DAMAGES

Table 2

Southbound SR 141 Over Southbound I-95 (Saturday and Sunday)		
Contractor Damages for Failure to Reopen Lanes		
Day All Lanes Reopened	Time All Lanes Reopened ("Verizon Time")	One Lane Closure
Saturday	10:00 AM to 10:59 AM	No Damages
	11:00 AM to 11:14 AM	\$250
	11:15 AM to 11:29 AM	\$500
	11:30 AM to 11:44 AM	\$750
	11:45 AM to 11:59 AM	\$1,000
	12:00 PM to 12:14 PM	\$1,500
	12:15 PM to 12:29 PM	\$2,000
	12:30 PM to 12:44 PM	\$2,500
	12:45 PM to 12:59 PM	\$3,000
	Not Opened by 1:00 PM	\$4,000
	Sunday	11:00 AM to 11:59 AM
12:00 PM to 12:14 PM		\$250
12:15 PM to 12:29 PM		\$500
12:30 PM to 12:44 PM		\$750
12:45 PM to 12:59 PM		\$1,000
1:00 PM to 1:14 PM		\$1,500
1:15 PM to 1:29 PM		\$2,000
1:30 PM to 1:44 PM		\$2,500
1:45 PM to 1:59 PM		\$3,000
Not opened by 2:00 PM		\$4,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
One Lane Closed	\$500/ 30 Minutes

The above will be assessed for up to a total of \$6,000 per day.

CONTRACT LIQUIDATED DAMAGES

Table 3

Northbound SR 141 Over Southbound I-95 (Monday through Friday)		
Contractor Damages for Failure to Reopen Lanes		
Time All Lanes Reopened ("Verizon Time")	One Lane Closure	Full Closure
5:00 AM to 5:59 AM	No Damages	No Damages
6:00 AM to 6:14 AM	No Damages	\$1,500
6:15 AM to 6:29 AM	No Damages	\$2,500
6:30 AM to 6:44 AM	No Damages	\$3,500
6:45 AM to 6:59 AM	No Damages	\$4,500
7:00 AM to 7:14 AM	\$1,000	\$5,000
7:15 AM to 7:29 AM	\$1,500	\$6,000
7:30 AM to 7:44 AM	\$2,000	\$7,000
7:45 AM to 7:59 AM	\$3,000	\$8,000
Not Open by 8:00 AM	\$5,000	\$10,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
One Lane Closed	\$750/ 30 Minutes
Full Closure	\$1,500/ 30 Minutes

The above will be assessed for up to a total of \$25,000 per day.

Table 4

SR 141 at Commons Boulevard (Monday through Friday)			
Contractor Damages for Failure to Reopen Lanes			
Time All Lanes Reopened ("Verizon Time")	Northbound SR 141 Closed North of Commons Boulevard	Northbound SR 141 Closed South of Commons Boulevard	Southbound SR 141 Closed at Commons Boulevard
5:00 AM to 5:59 AM	No Damages	No Damages	No Damages
6:00 AM to 6:14 AM	\$1,000	\$500	\$500
6:15 AM to 6:29 AM	\$2,000	\$1,000	\$1,000
6:30 AM to 6:44 AM	\$3,000	\$1,500	\$1,500
6:45 AM to 6:59 AM	\$4,000	\$2,000	\$2,000
7:00 AM to 7:14 AM	\$5,000	\$2,500	\$2,500
7:15 AM to 7:29 AM	\$6,000	\$3,000	\$3,000
7:30 AM to 7:44 AM	\$7,000	\$3,500	\$3,500
7:45 AM to 7:59 AM	\$8,000	\$4,000	\$4,000
Not Open by 8:00 AM	\$10,000	\$5,000	\$5,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
Full Closure	\$1,000/ 30 Minutes

The above will be assessed for up to a total of \$20,000 per day.

CONTRACT LIQUIDATED DAMAGES

Table 5

Southbound I-295 From Ramp N to Northbound I-95 to Station 7045+00 (Monday through Friday, Excluding Pier Construction)	
Contractor Damages for Failure to Reopen Lanes	
Time All Lanes Reopened ("Verizon Time")	One Lane Closure
5:00 AM to 5:59 AM	No Damages
6:00 AM to 6:14 AM	No Damages
6:15 AM to 6:29 AM	No Damages
6:30 AM to 6:44 AM	No Damages
6:45 AM to 6:59 AM	No Damages
7:00 AM to 7:14 AM	\$200
7:15 AM to 7:29 AM	\$400
7:30 AM to 7:44 AM	\$600
7:45 AM to 7:59 AM	\$750
Not Open by 8:00 AM	\$1000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
One Lane Closed	\$1,000/ 30 Minutes

The above will be assessed for up to a total of \$15,000 per day.

Table 6

Southbound I-295 From Ramp N to Northbound I-95 to Station 7045+00 (Pier Construction)		
Contractor Damages for Failure to Reopen Lanes		
Day All Lanes Reopened	Time All Lanes Reopened ("Verizon Time")	One Lane Closure
Friday	11:00 AM to 11:59 AM	No Damages
	12:00 PM to 12:15 PM	\$1,000
	12:15 PM to 12:30 PM	\$2,000
	12:30 PM to 12:45 PM	\$3,000
	12:45 PM to 12:59 PM	\$4,000
	1:00 PM to 1:14 PM	\$6,000
	1:15 PM to 1:29 PM	\$8,000
	1:30 PM to 1:44 PM	\$10,000
	1:45 PM to 1:59 PM	\$12,000
	Not Opened by 2:00 PM	\$14,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
One Lane Closed	\$1,500/ 30 Minutes

The above will be assessed for up to a total of \$29,000 per day.

CONTRACT LIQUIDATED DAMAGES

Table 7

Southbound I-95 / I-295 / I-495 at SR 141 Interchange (Monday through Friday)		
Contractor Damages for Failure to Reopen Lanes		
Time All Lanes Reopened ("Verizon Time")	Southbound I-95 / I-295 / I-495 Reduced to Single Lane of Slip Lane	Southbound I-95 / I-495 Reduced to Single Lane of Slip Lane
5:00 AM to 5:59 AM	No Damages	No Damages
6:00 AM to 6:14 AM	\$1,000	No Damages
6:15 AM to 6:29 AM	\$1,500	No Damages
6:30 AM to 6:44 AM	\$2,000	No Damages
6:45 AM to 6:59 AM	\$3,000	No Damages
7:00 AM to 7:14 AM	\$4,000	\$1,000
7:15 AM to 7:29 AM	\$6,500	\$1,500
7:30 AM to 7:44 AM	\$9,500	\$2,500
7:45 AM to 7:59 AM	\$12,500	\$5,000
Not Open by 8:00 AM	\$16,000	\$8,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
Southbound I-95 / I-295 / I-495 Reduced to Single Lane of Slip Lane	\$1,500/ 30 Minutes
Southbound I-95 / I-495 Reduced to Single Lane of Slip Lane	\$1,000/ 30 Minutes

The above will be assessed for up to a total of \$29,000 per day.

Table 8

Ramp G (Monday through Friday)	
Contractor Damages for Failure to Reopen Lanes	
Time All Lanes Reopened ("Verizon Time")	Full Closure
5:00 AM to 5:59 AM	No Damages
6:00 AM to 6:14 AM	\$250
6:15 AM to 6:29 AM	\$500
6:30 AM to 6:44 AM	\$750
6:45 AM to 6:59 AM	\$1,000
7:00 AM to 7:14 AM	\$1,300
7:15 AM to 7:29 AM	\$1,700
7:30 AM to 7:44 AM	\$2,100
7:45 AM to 7:59 AM	\$2,500
Not Open by 8:00 AM	\$3,000

Number of Lanes Closed beyond 8:00 am	Contractor Damages for Failure to Reopen Lanes beyond 8:00 am
Full Closure	\$500/ 30 Minutes

The above will be assessed for up to a total of \$8,000 per day

CONTRACT LIQUIDATED DAMAGES

A RUC of \$8,000.00/calendar day will be assessed for each day that the Contractor fails to reopen Ramp E after the allowable closure period has ended.

A RUC of \$12,000/calendar day will be assessed for each day that the Contractor fails to reopen Ramp H after the allowable closure period has ended.

A RUC of \$12,500/calendar day will be assessed for each day that the Contractor fails to reopen Ramp K after the allowable closure period has ended.

A RUC of \$3,000/calendar day will be assessed for each day that the Contractor fails to reopen Ramp L after the allowable closure period has ended. .

A RUC of \$15,000/calendar day will be assessed for each day that the Contractor fails to reopen Ramp M after the allowable closure period has ended. .

A RUC of \$10,000/calendar day will be assessed for each day that the Contractor fails to reopen Ramp N after the allowable closure period has ended.

A RUC of \$4,000/calendar day will be assessed for each day that the Contractor fails to reopen Eastbound Airport Road after the allowable closure period has ended.

A RUC of \$4,000/calendar day will be assessed for each day that the Contractor fails to reopen Westbound Airport Road after the allowable closure period has ended.

A RUC of \$500/calendar day will be assessed for each day that the contractor fails to end the configuration of Ramp L as a stop controlled approach to the I-95 southbound slip lane beyond the five days allowed to complete the Phase 5 and 6 Pier Demolition Stage III work.

The Contractor must complete the work shown in Phase 4, Phase 5 and Phase 6 of the Construction Phasing Plan within 845 Calendar days of the first chargeable day. In addition to other Liquidated Damages and RUC's assessed per this contract, a RUC of \$8,000/calendar day will be assessed for each Calendar Day beyond 845 Calendar Days from the first Chargeable Day that the Contractor's work activities requiring lane closures, lane width restrictions or shoulder width restrictions in the Phase 4, Phase 5 and Phase 6 work zones are not completed. Delays to the work shown in Phases 1, 2, and 3 of the Construction Phasing Plan will not be cause to extend the 845 Calendar Day milestone for completion of the work in Phase 4, Phase 5 and Phase 6.

Assessment of Road User Costs and Liquidated Damages will be made by change order. There is no limit on the number of days that RUC's can be assessed. The Engineer will be the sole approving authority as to when lane closures, lane width restrictions and shoulder width restrictions are complete after traffic is returned to the ultimate alignment.

The Contractor is advised that in order to complete the project on or before the number of calendar days proposed in his bid, it may be necessary to provide multiple crews, work overtime and/or weekends and holidays.

CONTRACT LIQUIDATED DAMAGES

Examples of calculations for assessment of Road User Cost:

- 1) Failure to reopen southbound SR 141 over southbound I-95 until 6:35 AM on a Monday, Verizon time:

Per Table 1 a RUC of \$4,000.00 will be assessed.

- 2) All lanes closed along northbound SR 141 over southbound I-95 as part of a full roadway closure until 9:10 AM on a Monday, Verizon time.

One lane closure from 9:10 AM to 11:05 AM

All lanes open starting at 11:05 AM

Per Table 3:

5:00 AM through 8:00 AM	=	\$10,000.00
8:01 AM through 8:30 AM	=	\$1,500.00
8:31 AM through 9:00 AM	=	\$1,500.00
9:01 AM through 9:30 AM	=	\$1,500.00
9:31 AM through 10:00 AM	=	\$750.00
10:01 AM through 10:30 AM	=	\$750.00
10:31 AM through 11:00 AM	=	\$750.00
11:01 AM through 11:30 AM	=	\$750.00

A RUC of \$17,500.00 will be assessed.

- END -

CONSTRUCTION ITEMS UNITS OF MEASURE

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

*Not used for units of measurement for payment.

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GENERAL NOTICES

SPECIFICATIONS:

The specifications entitled "Delaware Standard Specifications for Road and Bridge Construction, August, 2016", hereinafter referred to as the Standard Specifications; Supplemental Standard Specifications; the Special Provisions; notes on the Plans; this Bid Proposal; and any addenda thereto, shall govern the work to be performed under this contract. The Specifications and Supplemental Specifications can be [viewed here](#).

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.

PREQUALIFICATION REQUIREMENT

29 Del.C. §6962 (12)(a) requires a Department of Transportation project, excluding a Community ^{NEW} 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](#).

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

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

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

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

TAX CLEARANCE:

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

LICENSE:

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

SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

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

DIFFERING SITE CONDITIONS,

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

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

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

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has

provided the required written notice.

No contract adjustment will be allowed under their clause for any effects caused on unchanged work.

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

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

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

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

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

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

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

- (A) When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or
- (B) When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

CONFLICT WITH FEDERAL STATUTES OR REGULATIONS:

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

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

FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS

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

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

CONVICT PRODUCED MATERIALS:

- (a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:
 - (1) Produced by convicts who are on parole, supervised release, or probation from a prison or
 - (2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.
- (b) Qualified prison facility means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

TO REPORT BID RIGGING ACTIVITIES:

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

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

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

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

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for Minority Participation In
Each Trade

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

Goals for Female Participation In
Each Trade

6.9% (Entire State)

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

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

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

REV. 11-3-80

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

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. "Minority" includes:
 - i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Program Office or from the Federal procurement contracting offices. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant

to training programs approved by the U.S. Department of Labor.

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

- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participating, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
 9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).
 10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
 11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
 12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Order of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
 13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
 14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each

employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

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

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TRAINING SPECIAL PROVISIONS

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

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

The number of trainees to be trained under the special provision will be **three (3)**. In the event the contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year apprenticeship or training.

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

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

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

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Department of Highways and Transportation and the Federal Highway Administration. The Department of Highways and Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered

with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work the classification covered by the program. It is the intention of these provisions that the training is to be provided in the construction crafts rather than clerks-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some off-site training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

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

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

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

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

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

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

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INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT
& TRANSPORTATION EQUITY ACT

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

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION

The U.S. Department of Transportation (DOT) requires that the Delaware Department of Transportation continue the established Disadvantaged Business Enterprise (DBE) Program for participation in U.S. DOT

programs and that the program follow the final rules as stated in 49 CFR Part 26 and the Department's approved DBE Program plan.

The following definitions apply to this subpart:

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

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

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

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

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

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

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

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

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

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

Disadvantaged Business Enterprise 23 % Percent

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

Bidders are required to submit with their bids the completed DBE Program Assurance portion of the Certification document which will state the bidders intent of meeting the goals established for this contract; or in the instance where a contractor cannot meet the assigned DBE Goals for this contract, he/she shall at the time of bid submit documentation required to verify that he/she has made a Good Faith Effort to meet the DBE Goals. Guidance for submitting a Good Faith Effort is identified in the next section and in the DBE Program Plan. Further, the apparent low bidder must submit to DelDOT within five (5) calendar days after the bid opening, executed originals of each and every DBE subcontract to satisfy contract goals consistent with the DBE Program Assurance submitted as part of the bid package.

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

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

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

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CRITICAL DBE REQUIREMENTS

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

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

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

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

6. In the execution of this contract, the successful bidder agrees to comply with the following contract assurance and will include this same language in each subcontractor contract:
"The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such remedy as the recipient deems appropriate." 49 CFR Section 26.13
7. In addition to this specification, bidders must comply with all provisions of the rules and regulations adopted by the U.S. Department of Transportation for DBE participation in U.S. DOT and DeIDOT Programs (49 CFR Part 26) and the Delaware Department of Transportation Disadvantaged Business Enterprise Program Plan; each of which is hereby incorporated and made part of this specification. Bidders are also reminded that they must be responsible and responsive bidders in all other aspects aside from the DBE Program in order to be awarded the contract.
8. In accordance with 49 CFR 26.53(f)(1), DeIDOT requires that a prime contractor not terminate a DBE subcontractor without prior written consent from the DeIDOT Civil Rights Office. This includes, but is not limited to, instances in which a prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

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GUIDANCE FOR GOOD FAITH EFFORT

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

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

1. Efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goal. Selection of portions of work are required to at least equal the goal for DBE utilization specified in this contract.
2. Written notification at least ten (10) calendar days prior to the opening of a bid soliciting DBE interest in participating in the contract as a subcontractor or supplier and for specific items of work.
3. Efforts made to obtain and negotiate with DBE firms for specific items of work:
 - a. Description of the means by which firms were solicited (i.e. by telephone, e-mail, written notice, advertisement).
 - b. The names, addresses, telephone numbers of DBE's contacted, the dates of initial contact; and whether initial solicitations of interest were followed-up by contacting the DBEs to determine with certainty whether the DBEs were interested.
 - c. A description of the information provided to DBE firms regarding the plans, specifications and estimated quantities for portions of the work to be performed.
 - d. A statement of why additional agreements with DBE's were not reached in order to meet the projected goal.
 - e. Listing of each DBE contacted but not contracted and the reasons for not entering a contract.
4. Efforts made to assist DBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.

5. Reasons why certified DBEs are not available or not interested.
6. Efforts to effectively use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal DBE assistance offices; and other organizations that provide assistance in recruitment and placement of DBEs.

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

1. Failure to contract with a DBE solely because the DBE was unable to provide performance and/or payment bonds.
2. Rejection of a DBE bid or quotation based on price alone.
3. Rejection of a DBE because of its union or non-union status.
4. Failure to contract with a DBE because the contractor normally would perform all or most of the work in the contract.

Administrative reconsideration:

Within five (5) days of being informed by DelDOT that it is not responsive because it has not documented sufficient good faith efforts, a bidder may request administrative reconsideration. Bidder should make this request in writing to the following reconsideration official: Director of Finance, DelDOT, 800 Bay Road, Dover, Delaware 19901, and Email a copy to dot-ask@state.de.us. The reconsideration official will not have played any role in the original determination that the bidder did not document sufficient good faith efforts.

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

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

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

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

I. GENERAL

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

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

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

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

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

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

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order

11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

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

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

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

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
 - a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
 - b. The contractor will accept as its operating policy the following statement:
"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."
2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
 - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
 - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
 - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

- d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
- a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
 - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
 - c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
- a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
 - b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
 - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
6. Training and Promotion:
- a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
 - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the

special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

- c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
 - d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.
7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
- a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
 - b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
 - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.
 - d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.
8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
- a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
 - b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. Assurance Required by 49 CFR 26.13(b):
- a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
 - b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements

of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
 - a. The records kept by the contractor shall document the following:
 - (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
 - (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
 - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
 - b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

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

1. Minimum wages
 - a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits

(or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

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

- b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
 - (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (ii) The classification is utilized in the area by the construction industry; and
 - (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
 - (2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

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

2. Withholding

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

3. Payrolls and basic records

- a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
- b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.
- (2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons

employed under the contract and shall certify the following:

- (i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
 - (ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
 - (iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.
- (4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.
- c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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

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

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the

applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

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

b. Trainees (programs of the USDOL).

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

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

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

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

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

d. Apprentices and Trainees (programs of the U.S. DOT).

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

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

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

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for

termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
10. Certification of eligibility.
 - a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this

section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
 - a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:
 - (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
 - (2) the prime contractor remains responsible for the quality of the work of the leased employees;
 - (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
 - (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.
 - b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

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

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

1. That any person who is or will be utilized in the performance of this contract is not prohibited from

receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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

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

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
- d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from

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

- i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

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

- a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
 - (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
 - (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
 - (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

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

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

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

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

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

- 1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or

her knowledge and belief, that:

- a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
 3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

* * * * *

CARGO PREFERENCE ACT

Requirements in the Federal-aid Highway Program

(a) Agreement Clauses. "Use of United States-flag vessels:

(1) Pursuant to Pub. L. 664 (43 U.S.C. 1241(b)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.

(2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees—

(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

NOTE:

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

* * * * *

BUY AMERICA

Requirements in the Federal-aid Highway Program

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

In accordance with 23 U.S.C, 313 and 23 CFR 635.410, all iron and steel materials permanently incorporated into this project will be produced in the United States and that all manufacturing processes involving these materials will occur in the U.S, except that a minimal amount of foreign steel or iron materials may be used, provided the cost of the foreign materials does not exceed 0.1 percent of the total Contract cost or \$2,500.00, whichever is greater. If such minimal amount of foreign steel is used, the Contractor shall maintain a record of the costs to ensure that the allowable limit is not exceeded. This documentation shall be presented to the Department upon request.

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

* * * * *

APPENDICES TO THE TITLE VI ASSURANCE

APPENDIX A

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

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

APPENDIX E

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

Pertinent Non-Discrimination Authorities:

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

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

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

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

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

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

The Civil Rights Restoration Act of 1987,(PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964,The AgeDiscrimination Act of 1975and Section 504 of the Rehabilitation Act of 1973,by expanding the defrnition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

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

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

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

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

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

* * * * *

PREVAILING WAGES

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

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

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

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

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

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

PREVAILING WAGE REQUIREMENTS

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

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

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 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 15, 2019

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	55.89	55.89	55.89
CARPENTERS	55.95	55.63	44.22
CEMENT FINISHERS	35.48	35.70	28.39
ELECTRICAL LINE WORKERS	29.40	47.49	23.24
ELECTRICIANS	70.49	70.49	70.49
IRON WORKERS	65.24	26.10	27.72
LABORERS	45.30	41.69	40.93
MILLWRIGHTS	17.62	17.10	14.76
PAINTERS	71.29	71.29	71.29
PILEDRIVERS	72.65	25.98	29.47
POWER EQUIPMENT OPERATORS	67.07	43.32	39.68
SHEET METAL WORKERS	24.89	22.21	20.12
TRUCK DRIVERS	37.52	30.88	37.62

CERTIFIED: 03/29/2019

BY: [Signature]

ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

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

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE 302-761-8200.

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

PROJECT: T201109001.01 Federal Aid No. IM-N056(041) SR 141 Improvements I-95 Interchange to Jay Drive , New Castle County

GENERAL DECISION: DE190005 01/04/2019 DE5

Superseded General Decision Number: DE20180004

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: New Castle County in Delaware

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1 (a) (2) - (60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/04/2019

SUDE2018-002		03/15/2018
	Rates	Fringes
Bricklayer	53.89	
Carpenter	54.62	
Cement Mason/Concrete Finisher	34.63	
ELECTRICIAN		
Electrician	68.70	
Line Worker	24.02	
Ironworker	63.68	
Laborer	43.30	
Millwright	17.20	
Painter	68.79	
Power Equipment Operator:		
Piledriver	70.92	

Power Equipment Operator	45.46
Sheet Metal Worker	24.30
Truck Driver	36.49

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

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

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

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of “identifiers” that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those

classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

END OF GENERAL DECISION

APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS

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

* * * * *

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

GUIDELINES

HIGHWAY CONSTRUCTION

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

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

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

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

SUPPLEMENTAL SPECIFICATIONS TO THE STANDARD SPECIFICATIONS

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

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

- To access the Website;
- in your internet browser, enter; <https://www.deldot.gov>
 - under 'BUSINESS', Click; 'Publications'
 - scroll down under 'MANUALS' and Click; "Standard Specifications"
 - be sure and choose the correct Standard Specification year; 2001 or 2016
 - choose the latest revision prior to the date of this advertisement

The full Website Link is;
https://www.deldot.gov/Publications/manuals/standard_specifications/index.shtml

Copies of the Supplemental Specifications can be printed from the Website.

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

SPECIAL PROVISIONS

CONSTRUCTION ITEM NUMBERS

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

Standard Item Number:

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

Special Provisions Item Number:

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

Examples

Standard Item Number - 202000 Excavation and Embankment

202 Indicates Section Number

000 Indicates Sequential Number

Special Provision Item Number - 202500 Grading and Reshaping Roadway

202 Indicates Section Number

500 Indicates Sequential Number

SECTION 108.04

DELETE STANDARD SPECIFICATION SECTION 108.04 IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

108.04 Progress Schedule

A. General

1. Definitions

- a. **Activity.** A discrete, identifiable task or event that takes time, has a definable start and stop date, furthers the progress of the work, and can be used to plan, schedule, and monitor the project.
- b. **Activity, Critical.** An activity on the critical path.
- c. **Activity, Near-Critical.** An activity with a total float value within 30 workdays of the float on the critical path.
- d. **Activity ID.** A unique, alphanumeric, identification code assigned to an activity.
- e. **Constraints.** A restriction imposed on the start or finish date of an activity.
- f. **Critical Path.** The longest work path that forecasts the project's substantial completion date. After the contractor achieves substantial completion, the critical path is the longest work path that forecasts the project acceptance date as that date is defined in 105.16, Project Acceptance; Partial Acceptance. Milestones also have critical paths defined as the longest work path that forecast the completion of the milestone.
- g. **Data Date.** The date from which the schedule is calculated and early and late start and finish dates are forecast.
- h. **Duration, Original.** The estimated time, expressed in workdays, needed to perform an activity.
- i. **Duration, Remaining.** The estimated time, expressed in workdays, needed to complete an activity.
- j. **Early Completion Schedule.** A progress schedule that forecasts achievement of the substantial completion date prior to the substantial completion date established by the contract.
- k. **Float.** The amount of time an activity or work path can be delayed and not delay the substantial completion date. After the contractor achieves substantial completion, float is the amount of time an activity or work path can be delayed and not delay the project acceptance date as that date is defined in 105.16, Project Acceptance; Partial Acceptance.
- l. **Float, Sequestered.** Float hidden in activity durations or consumed by unnecessary or overly restrictive logic.
- m. **Float, Total.** The difference calculated in workdays between an activity's early and late dates.
- n. **Lag.** An amount of time, measured in workdays, between when an activity starts or finishes and when its successor activity can start or finish.
- o. **Milestone.** An activity with no duration that is typically used to represent the beginning or end of the project or its interim stages.
- p. **Written Narrative (WN).** A descriptive report submitted with each schedule.
- q. **Open End.** The condition that exists when an activity has either no predecessor or no successor.
- r. **Predecessor.** An activity that is defined by schedule logic to precede another activity. A predecessor may control the start or finish date of its successor.

- s. **Relationship.** The interdependence among activities. Relationships link an activity logically to its predecessors and successors.
- t. **Schedule, Baseline.** The approved CPM schedule showing the original plan to complete the entire project.
- u. **Schedule, Baseline Barchart.** The approved initial barchart schedule showing the original plan to complete the entire project.
- v. **Schedule, Bi-weekly Look Ahead Bar Chart.** A bi-weekly update of the baseline barchart schedule or the previous bi-weekly look ahead barchart schedule that depicts the work that is expected to occur during the following two weeks.
- w. **Schedule, Initial Baseline.** The CPM schedule showing the original, detailed plan for the first 60 calendar days of project duration.
- x. **Schedule, Monthly Update.** A schedule produced by incorporating the project's actual progress on a monthly basis into the baseline schedule or the previous monthly update schedule.
- y. **Schedule, Progress.** An initial barchart schedule, a baseline barchart schedule, a bi-weekly lookahead barchart schedule, a revised barchart schedule, an initial baseline schedule, a baseline schedule, a monthly schedule update, or a revised schedule.
- z. **Schedule, Revised.** A schedule prepared and submitted by the contractor that includes a significant modification to the schedule logic or durations.
- aa. **Schedule, Revised Barchart.** A barchart schedule prepared and submitted by the contractor that includes a significant modification to the schedule logic or durations.
- bb. **Schedule, Final.** The last schedule update containing actual start and finish dates for every activity.
- cc. **Successor.** An activity that is defined by schedule logic to succeed another activity.

2. General Requirements

- a. Prepare the progress schedule as specified in 108.04.B, Barchart schedules, or 108.04.C, Critical Path Method Schedules.
- b. The progress schedule depicts how the contractor plans to execute the work.
- c. Incorporate activities for all relevant parties including, but not limited to, the contractor, the Department, subcontractors, vendors, suppliers, utilities, railroads, government agencies or authorities, and other relevant parties.
- d. Use the progress schedule to plan, schedule, and coordinate the work.
- e. The Engineer's approval of a portion of the progress schedule or an incomplete schedule submittal will not indicate approval of the entire schedule.
- f. If the Engineer approves a progress schedule, the Engineer will return the approved schedule to the contractor as "Approved" or "Approved-As-Noted."
- g. The Engineer's approval of a schedule:
 - i. Does not change the contract.
 - ii. Does not constitute endorsement or validation by the Department of the contractor's logic, activity durations, or assumptions in creating the schedule.
 - iii. Does not transfer the contractor's responsibilities to the Department; the contractor alone shall remain responsible for adjusting forces, equipment, and work schedules to ensure completion of the work within the contract time.
 - iv. Does not guaranty that the project can be performed as scheduled.
 - v. Does not waive the contractor's obligation to provide notice in accordance with 104.03, Notice of Contract Changes.
- h. If the contractor or the Engineer discovers errors after the schedule has been accepted, correct the error in the next schedule submission.

- i. The Engineer may withhold payment of the Initial Expense contract item until the initial barchart schedule or initial baseline schedule is approved.
- j. Incorporate weather into the progress schedule. The contractor may incorporate weather either by providing weather days in the calendar of the progress schedule or by incorporating weather into the durations of the schedule activities. Do not incorporate weather into the schedule by adding a weather activity at the end of the scheduled work or by distributing weather activities throughout the schedule.
- k. Incorporate State of Delaware holidays into the schedule by identifying such days as non-work days in the calendar.
- l. Ensure that the project schedule complies with MOT restrictions.

3. Early Completion

- a. The Department allocates its resources to a contract based on the contract time. The Engineer may approve an early completion schedule, but cannot guaranty that Department resources will be made available to support the contractor's plan to meet such a schedule. Delays to the contractor's early completion schedule that result from the Department's inability to support the schedule are non-excusable and non-compensable.
- b. If the Engineer approves an early completion schedule, the time between the forecasted early substantial completion date and the contract substantial completion date is classified as float.
- c. If the contractor experiences an excusable, non-compensable delay that does not delay the scheduled substantial completion date to a date later than the contract substantial completion date, the contractor is not entitled to a time extension for such delays.
- d. If the contractor experiences an excusable, compensable delay that does not delay the scheduled substantial completion date to a date later than the contract substantial completion date, the contractor is not entitled to a time extension or compensation for the delay.

4. Float Ownership and Sequestered Float.

- a. All float, including total float and sequestered float, is a shared commodity available to the project and is not reserved for use by the contractor or the Department.
- b. Do not sequester float. Examples of prohibited float sequestration include, but are not limited to:
 - i. Relationships between unrelated activities.
 - ii. Overly restrictive relationships between activities.
 - iii. Activities with excessively long durations.

B. Barchart schedules. Submit a barchart schedule, unless the contract requires a Critical Path Method (CPM) schedule.

- 1. **General Requirements.** Prepare a barchart schedule that conforms to the following minimum requirements:

- a. Include activities that describe:
 - i. Essential features of the work.
 - ii. The procurement of materials, equipment, fabricated components, articles of special manufacture, and all other work requiring a procurement process to obtain.
 - iii. The furnishing of drawings, plans, and other data required by the contract to be reviewed by the Engineer.
 - iv. Third party activities related to the contract.
- b. Show all work completing within the contract time.
- c. Provide a duration of no more than 20 working days for each activity.
- d. Break longer duration activities into two or more activities distinguished by the addition of a location or some other meaningful description.
- e. Identify the critical path.

2. Baseline Barchart Schedule.

- a. At least 7 calendar days before the preconstruction meeting, the contractor shall submit the baseline barchart schedule to the Engineer for review.
- b. Within 7 calendar days of receipt of the baseline barchart schedule, the Engineer will respond by either approving the baseline barchart schedule, rejecting the submission and identifying the reasons for rejection, or asking for more information.
- c. The baseline schedule shall be for the entire project scope of work.
- d. Establish the data date of the baseline barchart schedule as the project's Notice-to-Proceed date.
- e. Do not include actual progress in the baseline barchart schedule.

3. Bi-Weekly Look Ahead Barchart Schedule.

- a. Submit a bi-weekly look ahead barchart schedule every Friday depicting the work to be completed during the next two-week period.
- b. Include within the bi-weekly look ahead barchart schedule the description, duration, and sequence of work activities, along with the planned hours of work for the next two-week period.
- c. Base the bi-weekly look ahead barchart schedule on the approved baseline barchart schedule or the approved revised barchart schedule.
- d. Within 4 calendar days of receipt of the bi-weekly look ahead barchart schedule, the Engineer will provide comments.
- e. Address the Engineer's comments in the next bi-weekly look ahead barchart schedule.
- f. Submit subsequent bi-weekly look ahead barchart schedules even if the contractor and the Engineer have not agreed to the resolution of the Engineer's comments on a previous look ahead barchart schedule.

4. Revised Barchart schedule.

- a. The Engineer may request a revised barchart schedule when any one of the following events occur:
 - i. There is a change that affects the critical path.
 - ii. The actual sequence of work is different from that in the approved baseline barchart revised schedules.
 - iii. The scheduled substantial completion date is delayed to a date more than 10 calendar days later than the contract substantial completion date.
 - iv. The Engineer extends the contract time.
- b. The revised barchart schedule shall incorporate the following:

- i. The actual durations and sequence of completed work activities, including revised work.
 - ii. Modifications to the sequence or durations of remaining activities.
 - iii. Approved time extensions.
- c. The revised barchart schedule shall show the completion of all remaining work within the remaining contract time.
 - d. Submit the revised barchart schedule within 7 calendar days of receiving a written request from the Engineer.
 - e. The Engineer will respond within 7 calendar days by approving the revised barchart schedule, rejecting the schedule and identifying the reason(s) for rejection, or asking for more information.

C. Critical Path Method Schedules.

1. CPM Schedule Requirements.

- a. In addition to the requirements of the General subsection, prepare CPM schedules that comply with good scheduling practice as described in AGC's Construction Planning & Scheduling Manual and each of the following requirements:
 - i. Ensure that all native CPM Schedule files submitted to the Engineer will import flawlessly into Oracle's Primavera Project Management (P6) Software in use by DelDOT.
 - ii. Use the following settings:
 - Calculate total float using finish float.
 - Select critical activities as the longest path.
 - Use only the Retained Logic scheduling option.
 - Do not use User-Defined fields.
 - Use project-level calendars, not global or resource calendars.
 - Use project-level codes, not global- or EPS-level codes.
 - iii. Each activity shall:
 - Possess a unique activity description composed of a verb, object, and location.
 - Have a duration expressed in working days of not more than 20 working days unless otherwise authorized in writing by the Engineer.
 - Have at least one predecessor activity except for the first activity in the schedule.
 - Have at least one successor activity except for the last activity in the schedule.
 - Only use finish-to-start relationships unless otherwise authorized in writing by the Engineer.
 - Do not use activity lags unless authorized in writing by the Engineer.
 - iv. Use only task dependent, start milestone, and finish milestone activity types.
 - v. Include no more than 20% percent critical activities and no more than 30% near-critical activities, unless otherwise authorized in writing by the Engineer.
 - vi. Ensure that the CPM schedule includes activities for, at a minimum, the following items:
 - Notice-to-Proceed
 - Mobilization
 - The project milestones (e.g. phase and traffic switch start or finish dates specified in the contract) and availability dates specified in the contract.

- Submittal, review, and approval activities, including time periods for the Engineer’s approval activities using approval durations as specified in the contract.
 - Fabrication, delivery, installation, testing, and similar activities for materials, plants, and equipment.
 - Settlement or surcharge periods.
 - Utility notification and relocation.
 - Right-of-Way acquisitions.
 - Durations for receipt of permits.
 - All construction work.
 - Substantial completion.
 - Completion of the project.
- vii. Use only “Finish On or Before” activity constraints and apply only to contract-required milestone or completion dates, unless otherwise authorized in writing by the Engineer.
- viii. Use project-specific activity codes in place of WBS.
- ix. Ensure that each activity is assigned an activity code value for each of the following activity codes. (Examples of acceptable activity code values for each of the activity codes are listed below each mandatory activity code):
- Phase
 - Phase 1
 - Phase 2
 - Phase 3, etc.
 - Stage
 - Stage 1
 - Stage 2
 - Stage 3, etc.
 - Responsibility
 - Name of general contractor
 - Department
 - Names of Subcontractors, etc.
 - Location
 - Station 100+00 to 110+00
 - Station 110+00 to 120+00
 - East Abutment
 - West Abutment, etc.
 - Work type
 - Crew
- x. Assign each activity to one of the following project-specific calendars as identified in Table 108.04.1.

Table 108.04.1	
Acceptable CPM Schedule Activity Calendars	
Calendar Name	Non-workdays
Standard 5-day workweek	Weekends and holidays
7-day workweek	None
Seasonally restricted work	Weekends, holidays, December 1 through March 15
Concrete work	Weekends, holidays, December 1 through March 15
Asphalt Paving	Weekends, holidays, November 15 through March 15
Nighttime Asphalt Paving	Weekends, holidays, October 15 through April 30

- xi. Do not use other calendars unless otherwise authorized in writing by the Engineer.

- xii. File-Naming Convention. Use the schedule file naming convention depicted in Table 108.04-2. If the schedule submission is not approved, name the resubmitted files as shown in the table. The #####-### indicates a placeholder for the State Project Number.

Table 108.04-2 CPM Schedule Filename Convention			
Schedules	1st Version	2nd Version	3rd Version
Baseline Schedule (All Schedules until it is Accepted as Baseline)	#####-###-BASE-1	#####-###-BASE-2	#####-###-BASE-3
1 st schedule update	#####-###-UP01		
2 nd schedule update, etc.	#####-###-UP02		
1 st revised schedule	#####-###-RS01-1	#####-###-RS01-2	#####-###-RS01-3
1 st Update to revised schedule, etc.	#####-###-RUP01		

- xiii. Eliminate instances of out-of-sequence progress on the critical path and near-critical paths in monthly schedule updates and revised schedules.

2. Scheduling Representative.

- a. Designate a scheduling representative prior to submission of the baseline schedule.
- b. Submit the qualifications of the scheduling representative to the Engineer for approval.
- c. Propose a scheduling representative with at least three years of verifiable experience preparing and maintaining CPM project schedules on contracts of similar size and complexity.
- d. The Engineer's approval of the scheduling representative is required before the baseline schedule will be accepted.
- e. Replacement of the scheduling representative requires the Engineer's written approval.
- f. The scheduling representative is:
 - i. The person primarily responsible for development and maintenance of the CPM schedule.
 - ii. The contractor's representative in all matters that concern the schedule.
 - iii. The contractor's designated attendee to all schedule-related meetings.
 - iv. The scheduling representative shall also be knowledgeable of the status of the work throughout the duration of the project.

3. Initial Baseline Schedule.

- a. The Engineer will use the initial baseline schedule to monitor progress until the baseline schedule is approved.
- b. The initial baseline schedule is a detailed CPM schedule, prepared to the same standards as the baseline schedule, but only for the first 60 days of the project.
- c. The activities depicting the work after the first 60 days can be summary level activities with durations greater than 20 workdays.
- d. Establish the data date of the initial baseline schedule as the project's anticipated Notice-to-Proceed date.
- e. Do not include actual progress in the initial baseline schedule.
- f. At least 7 calendar days before the preconstruction meeting, submit the initial baseline schedule to the Engineer for review.
- g. The Engineer will respond within 14 calendar days by approving the initial baseline schedule, rejecting the schedule and identifying the reason for rejection, or asking for more information.

4. Baseline Schedule.

- a. The baseline schedule shall include the entire scope of work.

- b. The first 60 days of work depicted in the baseline schedule shall be identical to the first 60 days of work depicted in the initial baseline schedule.
- c. The baseline schedule shall be a detailed CPM schedule for the entire project duration.
- d. Establish the data date of the baseline schedule as the project's Notice-to-Proceed date.
- e. Do not include actual progress in the baseline schedule.
- f. Within 30 calendar days of the preconstruction meeting, the contractor shall submit the baseline schedule to the Engineer for review. The Engineer will respond within 21 calendar days of receipt of the baseline schedule by approving the baseline schedule, rejecting the baseline schedule and identifying the reason(s) for rejection, or asking for more information.
- g. For the first resubmittal and all subsequent resubmittals, re-submit the corrected baseline schedule addressing the Engineer's comments within 7 calendar days of receiving the Engineer's comments.
- h. The Engineer will respond within 7 calendar days of receipt of the resubmitted baseline schedule by approving the baseline schedule, rejecting the baseline schedule and identifying the reason(s) for rejection, or asking for more information.

5. Monthly Schedule Updates.

- a. Submit monthly schedule updates every month after approval of the baseline schedule.
- b. The first monthly schedule update shall be an update of the baseline schedule and shall have a data date that is coordinated with the date of the pay estimate.
- c. Submit all subsequent monthly schedule updates on the same workday each month.
- d. Meet with the Engineer each month prior to submission of the monthly schedule update to review and agree on the progress achieved in the prior month. Incorporate the status (actual start dates, actual finish dates, and new remaining durations for activities that have started, but not finished) agreed to in this meeting into the monthly schedule update.
- e. Other than updating for actual progress, minimize the number of revisions to the monthly schedule update. Describe the reason for changes to the schedule in the WN submitted with the monthly update schedule.
- f. The Engineer has the right to reject any revisions made to the monthly schedule update.
- g. Submit monthly schedule updates within 10 calendar days after of the data date of the monthly schedule update.
- h. The Engineer will respond within 10 calendar days of receipt of the monthly schedule update by approving the monthly schedule update, rejecting the monthly schedule update and identifying the reason for rejection, or asking for more information.
- i. Submit subsequent monthly schedule updates even if the Engineer has not approved the previous monthly schedule update.
- j. The requirements for the monthly schedule updates are otherwise the same as the baseline schedule.

6. Revised Schedule.

- a. Do not perform work in a sequence or durations substantially different from the sequence and durations depicted on the approved baseline schedule or monthly schedule updates.
- b. Submit a revised schedule if one of the following occurs:
 - i. The contractor desires to substantially deviate from the sequence or durations of planned work in the current monthly schedule update.
 - ii. The Engineer requests that the contractor demonstrate how it will recover a forecast completion date that is delayed more than 14 calendar days from the dates established by the contract time.
 - iii. The Engineer concludes that there is a substantial difference between the actual sequence or actual duration of the work, and the work as depicted in the monthly schedule update.
 - iv. The issuance of a change order or supplement agreement revises the planned sequence of work or the method and manner of its performance.

- v. There are significant changes to the critical path or near-critical paths.
- c. The requirement to prepare a revised schedule is not a directive by the Department to accelerate the work, but rather a directive for the contractor to seek the Department's acceptance of a proposal to recover forecast delay, which may or may not include acceleration.
- d. If the revised schedule is being submitted at the request of the Engineer, submit the revised schedule within 7 calendar days of the Engineer's request.
- e. The Engineer will respond within 10 calendar days of receipt of a revised schedule by approving the revised schedule, rejecting the revised schedule and identifying the reason(s) for rejection, or asking for more information.
- f. The requirements for the monthly schedule updates are otherwise the same as the baseline schedule.

7. CPM Schedule Submission Requirements. Provide the following with each CPM schedule submission:

- a. Provide a WN for each schedule submittal complying with the following:
 - i. For the initial baseline, baseline, and revised schedules, provide:
 - An explanation of the overall plan to complete the project, including where the work will begin and how work and crews will flow through the project.
 - The working days per week, number of shifts per day, number of hours per shift, the holidays to be observed, and how the schedule anticipates adverse weather days.
 - A statement describing the status of required permits.
 - A description of the number of crews and planned production rates for critical activities and near-critical activities.
 - A list of activities requiring coordination with the Department or 3rd parties such as utilities.
 - A statement identifying constraints and an explanation of the purpose of each constraint.
 - A statement describing the reason for the use of each lags.
 - A list of the key limited equipment or labor resources.
 - ii. For monthly schedule updates, provide:
 - A description of the status of the contract completion dates compared to the contract-required dates and the dates forecast in the last schedule submission.
 - A statement explaining why the contract completion dates are forecast to occur before or after the dates established based on the contract time.
 - A description of the reasons for the revisions made to the schedule.
 - A statement describing the status of permits.
 - A description of the status of activities requiring coordination with the Department or 3rd parties (e.g. Utilities).
 - A description of unusual labor, shift, equipment, or material conditions or restrictions encountered or anticipated since the previous schedule submission.
 - A statement identifying new or revised constraints and an explanation of the reason for and purpose of the revisions.
 - A statement describing the reason for the use of new or revised lags.
- b. **Gantt Charts.** Provide the following Gantt chart printouts in .pdf format with each CPM schedule submission:
 - i. "All Activities Printout." All activities grouped by Phase, Stage, and Location, with the critical path indicated in red.

- ii. “Critical Path Printout.” The critical path to substantial completion.
- iii. “Near-Critical Printout.” All near-critical activities grouped by total float values.
- iv. All CPM schedule printouts requested by the Engineer.

c. Gantt Chart Printout Information. Ensure that each Gantt chart printout contains the following information:

- i. Activity ID column
- ii. Activity Name column
- iii. Original Duration (OD) column
- iv. Remaining Duration (RD) column
- v. Start column
- vi. Finish column
- vii. Total Float column
- viii. Barchart Bars
 - Remaining work bar
 - Critical Remaining work bar
 - Title Block
 - Data date
 - Run date
 - CPM Schedule Name

D. Method of Measurement.

- 1. All costs of providing all barchart project schedules is incidental to the contract.
- 2. For CPM project schedules, the engineer will measure work acceptably completed as follows:
 - a. The Department will determine the lump sum item for baseline schedules to have been completed and ready for payment when the contractor submits and obtains the Engineer’s approval of the initial baseline and baseline schedules.
 - b. The Department will determine one monthly update schedule to be completed and ready for payment when a monthly schedule update, revised schedule, or a schedule incorporating a time impact analysis as required by 108.07, Extensions of Contract Time, has been submitted and approved by the Engineer.
 - c. The Department will not pay for CPM project schedules unless a schedule is submitted by the contractor and approved by the Engineer.

E. Basis of Payment.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
763001	Baseline Schedule	LS
763002	Monthly Update Schedule	EA Month

Price and payment will constitute full compensation for preparing, submitting, and obtaining the Engineer’s approval of progress schedules for the project.

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://www.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.

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

NOTE:

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

5/05/15

211505 - REMOVAL OF EXISTING BRIDGE

211505.01 Description:

Demolish, remove, dispose of, or salvage the existing Bridge designated for removal by the Contract Documents.

2011505.02 Materials:

Provide Materials specified in:

Borrow	Section 1001
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211505.03 Construction:

A. Schedule.

1. The demolition of the existing Bridge will commence in accordance with the construction phasing as indicated on the Plans. The Contractor may not initiate the mobilization of equipment for the demolition of the existing bridge until written authorization is granted by the Engineer.
2. Do not begin removal of existing Bridge until satisfactory arrangements have been made to accommodate traffic and the hauling of construction Materials.

B. Working Drawings.

1. Submit Working Drawings for review and concurrence, consisting of the proposed means and methods to demolish the existing bridge. Submit Working Drawings a minimum of 30 days prior to the commencement of any Bridge removal activities.
2. Working Drawings must be signed and sealed by a registered Professional Engineer in the State of Delaware. Include the following:
 - a. An itemized listing of the Equipment proposed for the Bridge removal.
 - b. Methods of protection for traffic, adjacent structures to remain, adjacent properties, and existing utilities adjacent to and beneath the bridge.
 - c. Methods of protection and safety for the general public, inspection personnel, and construction personnel.
 - d. The location and/or staging area(s) of major Equipment including cranes and haul trucks.
 - e. The Contractor's detailed proposed methods for removal of the existing Bridge by mechanical/machine means. The use of controlled demolition (i.e., explosive) techniques is prohibited for the removal of the existing Bridge or temporary shoring.
 - f. The location of disposal sites and the method of hauling Materials generated by the required work of demolishing the existing Bridge. Dispose of waste Material as specified in Section 106.08.
 - g. A schedule for the required work. Specifically address phased removal and time restrictions due to lane closure limitations as specified in the Contract Documents.
 - h. Detail plans and supporting calculations of any sheeting or shoring required for the removal of the existing abutments or any other element according to Section 604. Sheeting/shoring must be designed to support phased bridge removal and phased bridge construction as shown in the Contract Documents, accounting for all dead and live loads as applicable.

C. Removal of Existing Bridge.

1. Perform Phase I (during Construction phase 5) and Phase II (during Construction Phase 6) removal of the existing Bridge in phases in accordance with the approved Working Drawings. Acceptance of the Working Drawings by the Department will not relieve the Contractor of liability for safe demolition and/or removal of the Bridge.
2. Remove existing Bridge in its entirety according to approved Working Drawings, except for the existing deep foundations. Remove existing deep foundations within the footprint of the proposed substructure to 2 feet below the bottom of the proposed substructure footer. Remove existing deep foundations outside of the proposed substructure footprint to a minimum depth of 3 feet below the existing or proposed ground level, whichever is lower.

D. Backfill areas excavated for the purpose of existing Bridge removal to the original ground line, bottom of coarse aggregate, or bottom elevation of proposed road box, whichever is lower at each location where backfilling operations will occur. When backfilling cavities within the footprint of a proposed roadway box (including travel lanes, shoulders, and maintenance strips) or structure foundation, utilize Borrow Type C. When backfilling cavities outside of a proposed roadway box or structure foundation, utilize Borrow Type F. Compact backfill borrow as specified in Section 207.03.

211505.04 Method of Measurement:

A. The quantity of existing Bridge removal will not be measured.

211505.05 Basis of Payment:

A. Payment will be made at the Unit Bid Price as follows:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
211505	REMOVAL OF EXISTING BRIDGE	LS

B. Full (100%) payment will be based on the lump sum Unit Bid Price. Full payment is divided into the following two segments:

1. Payment for 10% of the Unit Bid Price will be made for preparing, submitting, revising, and receiving concurrence for the required Working Drawings.
2. Payment for 90% (45% for the completion of Phase I (during Construction phase 5) removal and 45% for the completion of Phase II (during Construction phase 5) removal) of the Unit Bid Price will be made for furnishing all Materials, Equipment, labor, and incidentals required to compete the remaining work as required; demolition and disposal of the existing bridge, backfilling, and for all Material, labor, Equipment, and incidentals necessary to complete the work. Separate payment will not be made for salvaging, storing, or protecting Materials in the Right-of-Way.

C. The Department will not make separate payment for furnishing or properly placing backfill borrow Material in areas excavated for the purpose of existing Bridge removal.

D. Sheeting used to temporarily support excavations for the removal of portions of the existing bridge will be incidental to this item.

E. Temporary shoring used to support embankment and existing bridge between phased construction activities will be specified and paid for under Item 604003 - Shoring.

F. Temporary protective shielding used to protect debris from impacting traffic will be specified and paid for under Item 604001 - Protective Shield.

12/19/2018

401577 - PAVER-LAID ULTRATHIN BITUMINOUS CONCRETE

Description:

This work consists of furnishing and placing of a single, hot, specially-graded, bituminous concrete wearing surface; this surface lift shall be placed immediately after a heavy application of a polymer-modified tack coat has been sprayed on the existing surface. The resulting surface should be homogeneous, well textured, and durable.

Materials:

Tack Coat. The tack coat shall be a cationic asphalt emulsion modified with an approved natural or synthetic polymer. It shall be smooth and homogeneous; and it shall conform to the following requirements:

TEST (AASHTO T 59, EXCEPT AS NOTED)	MINIMUM	MAXIMUM
Elastic Recovery @10C (AASHTO T301)	58	-
Distillation: Asphalt, % by Mass ⁽¹⁾	63	-
Viscosity [77°F , SSF]	20	100
Storage stability (% , 24 hour sedimentation)	-	1
Sieve test (% mass, 850 microns)	-	0.10
Demulsibility (% , dioctyl sodium sulfosuccinate)	40	-

⁽¹⁾ T59 Modified to include 350°F ±10°F maximum temperature to be held for a period of 15 minutes. Use an ASTM 16C thermometer to monitor the temperature of the emulsion.

Asphalt Cement. The asphalt binder shall meet the requirements of Superpave PG 76-22 performance grade asphalt, as referenced in the Plans, Specifications, and/or Notes, according to AASHTO M320, Table 1 and tested according to AASHTO R29 with the following test ranges:

TEST PROCEDURE	AASHTO REFERENCE	SPECIFICATION LIMITS
Temperature, °C	M320	Per Grade
Original DSR, G*/sm (δ)	T315	1.00 - 2.50 kPa

If the roadway has an ADT greater than 8,000 and a posted speed limit greater than 35 MPH, the aggregates shall be non-carbonate.

Recycled asphalt pavement (RAP) and recycled asphalt shingles (RAS) shall not be used for this item.

Coarse Aggregate. The coarse aggregate shall conform to Section 805, Coarse Aggregate, shall be 100% crushed material, and shall conform to the following property and grading requirements:

TEST (AASHTO TEST METHOD)	RESULT
L.A. Abrasion (T 96)	30 % maximum
Soundness, sodium sulfate, % loss (T104)	15% maximum
Flat & Elongated, 5:1, +4.75 mm (ASTM D4791)	10% maximum
Water Absorption (T 85)	2 % maximum
Clay Lumps and Friable Particles (T 112)	2 % maximum
Micro Deval, % loss (T327)	18% Maximum

Fine Aggregate. The fine aggregate shall conform to Section 804, Fine Aggregate for Use in Portland Cement Concrete and shall be 100% crushed material meeting the following requirements:

TEST AND AASTO METHOD	LIMIT
Sand Equivalent (T176)	45 minimum
Uncompacted Void Content (T304)	40 minimum

Mineral Filler. Mineral filler shall conform to AASHTO M 17; and it shall be baghouse fines, rock dust, crushed limestone, hydrated lime, or flyash.

Bituminous Concrete Wearing Surface:

This wearing surface shall be a combination of coarse and fine aggregate, mineral filler, and asphalt cement. The wearing surface shall be mixed in conformance to the applicable requirements of Section 401. The job mix formula shall be submitted by the Contractor to and approved by the Engineer. The job mix formula shall identify a single target percentage of material passing the individual sieves within the Master Band Gradation Limits, as indicated on the following table. Production shall be at or within the tolerances from the approved job mix formula percentages for each sieve, as indicated on the following table, showing production tolerance (plus or minus from the job mix formula value):

Master Band Gradation Limits

SIEVE SIZE	PERCENT PASSING BY WEIGHT	
	TYPE C	
3/4"	100	
1/2"	85 – 100	
3/8"	60 – 80	
#4	28 – 38	
#8	19 – 32	
#16	15 – 23	
#30	10 – 18	
#50	8 – 13	
#100	6 – 10	
#200	4.0 – 5.5	

Hot-Mix Design Criteria

PROPERTY	TYPE A	TYPE B	TYPE C
Asphalt Content	5.0 – 5.8	4.6 – 5.8	4.6 – 5.6
Draindown Test (T305)	0.10% max		
Moisture Sensitivity (T283) ⁽¹⁾	80% min		
Application Rate (lb/sy) ⁽²⁾	70 (± 10)	80 (± 10)	90 (± 10)
Tack Rate (gal/yd ²)	0.14	0.17	0.20

⁽¹⁾ Follow AASHTO T283 with the following exceptions:

- a. Condition the mixture for 2 hours in accordance with AASHTO R30, Section 7.1.
- b. Compact the SGC specimens to 100 gyrations.
- c. Extrude the samples as soon as possible without damage to the sample.
- d. Use AASHTO T269 to determine the void content.
- e. Record the void content of the specimens (for reference only)
- f. If less than 55% saturation is achieved, the procedure does not need to be repeated unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.

⁽²⁾ Application rates outside of these ranges must be approved by the Engineer.

Construction Methods:

Surface Preparation. Before applying the tack and the paver-laid ultrathin hot mix, all thermoplastic pavement markings shall be removed; all debris, dust, and loose surface material shall be removed by a mechanical or vacuum type sweeper.

Environmental Requirements. The pavement shall not be wet (although it may be damp). The ambient and pavement surface temperature shall be at least 50°F.

Equipment. Hauling and compaction equipment shall meet the applicable requirements of Section 401.

The tack application and the hot mix placement and screeding shall be performed by a single piece of equipment. The placement operation shall advance at a rate of 30 to 100 feet per minute, placing a full lane width in one pass. The tack shall be applied by a metered pressure sprayer; the meter must accurately and continuously monitor the rate of the tack application.

Tack Application. The tack shall be applied uniformly over the entire width and length to be overlaid; application shall be at a rate of 0.20 ± 0.05 gal/yd²; and the application shall be at a temperature of 140°F to 180°F. No part of the paving machine or other equipment shall come into contact with the tack coat.

Bituminous Concrete Overlay. The bituminous concrete wearing surface shall be placed on the tack within 5 seconds after the tack has been applied (with the exception of small areas where hand work is required). The mixture shall be placed at a temperature of 300°F to 330°F. The bituminous concrete shall be smoothed over its full width, and length, using a heated screed to ensure an even mat surface.

Compaction. The wearing surface shall be compacted using a minimum of 2 double-drum static 10 ton steel wheel rollers. At least two complete roller passes shall be completed before the mix cools to 160°F at mid-layer.

Opening to Traffic. The new pavement surface shall be opened to traffic immediately after rolling has been completed.

Performance Requirements. Materials, equipment, and labor shall be utilized in methods and procedures which will provide a product with adequate ride smoothness, with proper texture for high skid resistance and low tire contact noise, and with durability.

Method of Measurement:

The quantity of paver-laid ultrathin bituminous concrete will be measured as the number of square yards measured at the surface of the bituminous concrete placed and accepted.

Basis of Payment:

The quantity of paver-laid ultrathin bituminous concrete will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for preparing the surface, for furnishing, hauling, and placing all materials, for furnishing labor, for furnishing equipment and tools, and incidentals necessary to complete the work.

7/26/2018

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description

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

.02 Bituminous Concrete Production – Quality Acceptance

(a) Material Production - Tests and Evaluations.

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

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

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

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

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

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

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

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

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

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

(b) Pavement Construction - Tests and Evaluations.

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

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

The exempt areas around manholes will be a maximum of 4 feet transversely on either side from the center of the manhole, and 20 feet longitudinally on either side from the center of the manhole. The exempt areas around driveway entrances shall be the entire width of the driveway, and 3 feet from the edge of the longitudinal joint next to the driveway. Areas of exemption that will be cored for informational purposes only include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.03 I in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status.

The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.02 Acceptance Plan (a) Material**

Production - B Tests and Evaluation and analyzing the compaction results over the individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

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

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

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

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

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

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

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

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

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

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

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

use the JMF design value in addition to the available values to calculate the average theoretical maximum specific gravity.

.03 Payment and Pay Adjustment Factors.

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

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

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

(a) Material Production - Pay Adjustment.

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

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

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

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

factors shall be determined by Column B. When any property of a single test is outside of the Single Test Tolerance parameters defined in Table 2, the Material Pay Adjustment factor shall be determined by Column C

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

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

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

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

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

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

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

88	1.07	1.14	1.15	1.16	1.16	1.16	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12
86	1.04	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66
73	0.75	0.69	0.66	0.65	0.64	0.63	0.63
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32

Table 3 - Quality Level Analysis by the Standard Deviation Method							
PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24

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

96	+1	-4
95	0	-5
94	-1	-6
93	-2	-7
92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

(b) Pavement Construction - Pay Adjustments.

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

- Degree of compaction of the in-place material

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

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

Table 5: Compaction Price Adjustment Highway Locations		
Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0

94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3
93.0	92.75 – 93.25	5
92.5	92.26 – 92.74	3
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	-5
90.5	90.26 – 90.74	-15
90.0	89.75 – 90.25	-20
89.5	89.26 – 89.74	-25
89.0	88.75 – 89.25	-30
88.5	88.26 – 88.74	-50
=<88.0	=<88.25	-100*

* or remove and replace it at Engineer's discretion

Table 5A: Compaction Price Adjustment Other¹ Locations		
Degree of Compaction	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1

88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5
87.5	87.26 – 87.74	-10
87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30
85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
=< 84.0	=<84.25	-100*

* or remove and replace at Engineer's discretion

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

.04 Dispute Resolution.

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

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

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

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

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

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

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

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

Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement

Description.

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

Materials and Equipment.

The following material shall be available to complete this work:

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

The following equipment shall be available to complete this work:

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

Construction Method.

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

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

Performance Requirements.

The Engineer will judge the patch on the following basis:

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

Basis of Payment.

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

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

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

1. Contact Materials & Research (M&R) personnel to determine if information about the area is already available. If M&R has already obtained cores in the location that is being investigated, the contractor may opt to use the laboratory information for the investigation and not core the area on their own.
2. If M&R does not have information concerning the section of the roadway, the contractor needs to contact M&R to arrange for verification of coring operations. Arrangements shall be made to allow for an individual from M&R to be on the site when the cores are obtained. Cores will be turned over to M&R for evaluation.
3. The Contractor is responsible for providing all traffic control and repairing core holes in accordance to 401699 Appendix A - Repairing Core Holes in Bituminous Asphalt Pavements.
4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.
5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.
6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.
7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

Structural Number Calculations

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

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

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

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

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

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

Example:

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

Calculation:

For the Type B lift the calculation would be:

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

For the Type C lift the calculation would be:

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

10/5/16

501502 - DIAMOND GRINDING P.C.C. PAVEMENT AND PRECAST PAVEMENT

Description:

This work consists of end-to-end texturing (blanket grinding) of the pavement surface to provide consistent texture and improved ride quality on existing pavement and patching.

Equipment:

Grinding Equipment: A self-propelled machine with diamond-impregnated grinding blades that does not strain or damage the pavement and that has demonstrated successful grinding and texturing of concrete pavements. The equipment must produce a pavement surface having a corduroy-type texture consisting of grooves 1/8 inch \pm 1/32 inch wide parallel to the centerline of the roadway spaced 1/16 to 1/8 inch apart and 1/16 inch \pm 1/32 inch deep.

The equipment must contain a system capable of capturing all slurry or residue resulting from the grinding and texturing operations and discharging material into suitable holding tanks.

10' Straightedge: a rigid 10' straightedge capable of measuring deviations.

Testing:

The contractor must test areas patched under this contract using an approved 10' straightedge for compliance to specifications. Newly patched areas must not have any deviations (high or low) exceeding 0.25" in 10'

Correction Methods:

Areas patched under this contract must be corrected prior to blanket grinding the entire roadway. Do not create new deviations during the corrective work.

Texturing / Blanket Grinding:

Texture / blanket grind the pavement longitudinally. Begin and end at lines approximately perpendicular to the pavement centerline. Texture the full pavement width including all adjacent lanes. Grinding and texturing must be completed before placement of new joint sealant. The final pavement surface must allow surface water to flow freely off the traveled way.

Before opening a lane to traffic, the pavement surface shall be clean, and it shall have no cross-slope deviations exceeding 1/8 inch in 10 feet.

Method of Measurement:

The quantity of excessive deviations in areas patched under this contract that must be corrected will not be measured for payment

The quantity of blanket grinding of PCC pavement will be measured by square foot.

Basis of Payment:

The quantities for correcting excessive deviations in P.C.C. pavement and diamond grinding will not be paid.

The quantity for blanket grinding of PCC pavement will be paid by square foot unit price.

Any pavement joint sealant that was placed for this contract and damaged by the grinding operations must be repaired at no expense to the Department.

5/22/18

501503 - PRECAST CONCRETE PAVEMENT PANELS

Description:

This work consists of furnishing and installing a full-depth precast concrete pavement system. This includes the survey, design, fabrication, transportation of panels and materials, saw cutting and removal of existing pavement, base adjustments, placement of bedding material, grouting as required, diamond grinding, joint sealing, placement of temporary pavement transitions and all necessary materials and equipment to complete the work as shown on the Contract Plans.

References:

- PCI Design Handbook, 7th Edition, with all Interims and Errata
- AASHTO M111: Standard Specifications for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products
- AASHTO M235: Standard Specifications for Epoxy Resin Adhesive
- ASTM B633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- ASTM C637: Standard Specification for Aggregates for Radiation-Shielding Concrete
- ASTM C938: Standard Practice for Proportioning Grout Mixtures for Preplaced-Aggregate Concrete
- ASTM C1107: Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- ASTM C2665: Standard Specification for Poly Vinyl Chloride (PVC) Drain, Waste and Vent Pipe and Fittings
- ASTM D3963: Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars
- ASTM D4101: Standard Specification for Polypropylene Injection and Extrusion Materials
- ASTM C109: Standard Test Method for Compressive Strength of Hydraulic-Cement
- ASTM C157: Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
- ASTM C266: Standard Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles
- ASTM C666: Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
- ASTM C939: Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
- ASTM C940: Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory
- ASTM C942: Standard Test Method for Compressive Strength of Grouts for Preplaced-Aggregate Concrete in the Laboratory
- ASTM C1038: Standard Test Method for Expansion of Hydraulic Cement Mortar Bars Stored in Water
- ASTM C1090: Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic Cement Grout

Submittals:

(A) Shop Drawings:

- Prepare shop drawings for each unique panel stamped by a Professional Engineer licensed in the State of Delaware.
- Shop Drawings shall include the following:
 - A) Length, width and thickness dimensions (including surface planarity) for each unique panel.
 - B) Detail and locate reinforcement (bar chart required).
 - C) Detail and locate grout channels, ports and vents, block-outs, key-ways, dowel bars, tie bars and embedded hardware.

- D) Detail and locate lifting inserts and devices. Lifting stress calculations shall be submitted with Shop Drawings.
- E) Edge and surface finish details.

- Design calculations shall be submitted with Shop Drawings.

(B) Installation Plans:

- Prepare a detailed installation plan for approval by the Engineer at least 30 days before beginning panel installation.
- Include the following at a minimum in the installation plan:
 1. Detailed panel and joint drawings.
 2. Details for removal of existing pavement and saw cut plan matching new panel sections.
 3. Details for subgrade improvements including procedures and equipment used to achieve required grade and compaction.
 4. Details for placement of panel support materials.
 5. Details for placement of grout dams around panel perimeters.
 - A) For grade-supported panels include the following:
 - i. Bedding material composition and gradation.
 - ii. Procedures and equipment used to place, compact and grade bedding material.
 - iii. Bedding grout instructions to fill small isolated voids between the panel and bedding.
 - B) For grout supported panels include the following:
 - i. Panel leveling details, using embedded leveling devices.
 - ii. Grout material properties, composition, mix design (if appropriate), and design strength.
 - iii. Procedure and equipment used to prepare and place grout beneath the panels.
 6. Detailed procedures for lifting, moving, lowering and adjusting panels into position.
 7. Procedure and equipment used to verify that panel surface is at the correct grade and cross slope.
 8. Details for placement of dowel bars and longitudinal joint ties.
 9. Details for grout encasement of dowel bars, longitudinal joint ties, lifting inserts and grout ports.

(C) Contractor Quality Control (QC) Plan:

- The Contractor must submit a QC plan to the Engineer at least 30 days before beginning panel installation. The QC plan shall include a detailed description of how the Contractor intends to ensure panels are installed in accordance with specifications and special provisions.
- The QC plan shall include the following at a minimum as applicable:
 1. The Contractor's installation team including names, titles, responsibilities and authorities of the project manager, job site foreman, team leaders, surveyor or layout person and crew members.
 2. All team member certifications, qualifications and training (include Pavement System Developer provided training).
 3. Designate by name and title the team member who will be responsible for marking, sawing and removal of existing pavement.
 4. Designate by name and title the team member who is responsible for ensuring that the subgrade material and bedding material meet compaction and grade requirements.
 5. Designate by name and title the team member who is responsible for delivery of the un-damaged pavement panels to the job site for placement.
 6. Designate by name and title the team member who is responsible for placement of pavement panels and ensuring that pavement panels meet grade requirements.
 7. Designate by name and title the team members who the Department's inspectors are to interact with in all QC/QA matters.

Materials:

- A. Concrete: Use Portland Cement Concrete (PCC) that is in compliance with the Standard Specifications, except that the minimum 28-day compressive strength shall be 5,000 psi. and the minimum 28-day flexural strength shall be 650 psi. Use 1-inch maximum size aggregate. Submit a PCC mix design using the absolute volume method per ACI Publication 211.1 a minimum of 30 days prior to casting panels.
- B. Reinforcing Steel: Reinforcing steel shall comply with the Standard Specification. Bars shall be epoxy coated on all surfaces and shall be full length, single bars. Do not use lap splices within the panel. Handling of bars shall comply with ASTM D3963.
- C. Dowel Bars and Tie Bars: Dowel bars and tie bars shall comply with the Standard Specifications and all surfaces shall be epoxy coated.
- D. Grout Channels, Ports and Vents: Use Schedule 40 PVC pipe in conformance with ASTM D 2665 or Corrugated Plastic Duct that is sufficiently rigid to withstand loads imposed during placing of concrete while maintaining its shape, remaining in proper alignment and remaining watertight.
- E. Lifting Inserts and Devices: Lifting inserts and devices shall meet the following criteria:
 - Use inserts and devices that can support the required vertical and horizontal forces with the applicable safety factors as specified in Chapter 5 of the PCI Design Handbook, 7th edition
 - Use inserts and devices that have a 3-inch top cover and a minimum 1-inch bottom cover after panel installation. This may require partial removal of the devices after installation.
 - Coil loop lifting inserts shall be electro galvanized in accordance with ASTM B633 all other lifting inserts and devices shall be galvanized after fabrication in accordance with AASHTO M111.
- F. Grout Dams: Shall be foam strips fabricated from rigid high-density extruded polystyrene (XPS) conforming to ASTM C578 Type VII or approved equal. Grout dams shall be sized appropriately to prevent leakage during all under-panel grouting.
- G. Grout: Grout shall meet the following criteria:
 - Grout for grout-supported bedding material may be proportioned under ASTM C938 or use prepackaged grout complying with ASTM C1107. Fine aggregate if used must meet grading two (2) in ASTM C637. Proportion the ingredients of the grout to meet the properties in Table 1.

**TABLE 1
Cementitious Bedding Material Properties**

Quality Characteristic	Test method	Requirement
Compressive Strength at 1 hour	ASTM C942	500 PSI Min.
Compressive Strength at 7 days	ASTM C942	2,500 PSI Min.
Expansion	ASTM C940	0 to 3.0%
Bleeding at 30 minutes	ASTM C940	0.10% Max.
Eflux Time	ASTM C939	15 to 30 seconds
Shrinkage at 28 days	ASTM C157	<0.04% dry
Flowability	ASTM C939	30 seconds - 1/2" flow cone

-Grout for encasement and fill material shall meet the requirements shown in Table 2.

**TABLE 2
ENCASEMENT AND GROUT FILL MATERIAL REQUIREMENTS FOR MORTARS**

Property	Test Method	Requirement
Compressive Strength, 28-day min.	ASTM C109	5,000 psi min
Compressive Strength, open to traffic	ASTM C109	2,500 psi
Maximum Expansion	ASTM C1090	0.40%
Maximum Shrinkage	ASTM C1090	0.050%
Freeze-Thaw, min.	ASTM C666	95.0% @ 300 cycles
Initial Set Time, min.	ASTM C266	15 min.
Chloride Content, max.	ASTM C1152	0.050%
Sulfate Content, max.	ASTM C1038	0.01%

- Grout will be tested for compressive strength by the Department at intervals determined by the Engineer.

H. Granular Bedding for Grade-Supported Panels: Bedding material for grade-supported panels shall be crushed stone meeting the gradation in Table 3 below. The material shall be free of deleterious material and shall be supplied at the optimum moisture to facilitate compaction and consolidation.

**Table 3
Granular Bedding Course Gradation**

Sieve Size	Percent Passing
3/8 inch	100%
#4	85-100%
#10	55 – 75%
#40	10 – 40%
#200	0 – 10%

- I. Epoxy Resin Adhesive for Securing Drilled Dowels: Use epoxy resin that conforms to the requirements of AASHTO M 235 Type IV. Use grout retention rings, dowel bar caps and best practices to provide a good bond.
- J. Joint Sealant: Joint sealant material shall comply with Section 808 of the Standard Specifications.

Quality Control and Assurance:

Precast pavement panels shall be manufactured in a PCI or NPCA certified plant.

Quality Control (QC) is the responsibility of the fabricator. The person in charge of the QC Department must have completed Level II or Level III segments of the PCI Plant Quality Personnel Certification Program and hold a current certification or PQS II – QA/QC of the NPCA Certification Program and hold a current certification, unless otherwise agreed by the Engineer. All technicians at plants manufacturing precast pavement panels shall hold a current ACI Concrete Field Testing Technician Certification Grade 1, or equivalent, or work under the direct supervision of an ACI certified technician who shall be on site for the full duration of testing.

The Department will perform Quality Assurance. The role of the QA Inspector includes but is not limited to:

- Witnessing, documenting, and reporting on the performance of the QC Department.
- Collecting all certifications, calibrations, and reports necessary to assure that the product meets the specified requirements.
- Witness the testing of all fresh concrete.
- Witness the placement of all concrete.
- Witness the testing of process control cylinders for release, stripping, lifting and design strength.
- Determine the acceptability of the finished product.

The fabricator must give two (2) week notice to the Department prior to beginning any of the above operations. The presence of the QA Inspector does not relieve the Contractor of the responsibility of meeting all the requirements of the plans and specifications herein.

The fabricator shall identify each panel by date of cast, identification number and manufacturer identification. Panel identification shall be by etching, printed label or RFID chip. Etch markings in fresh concrete on two sides and bottom. Etching shall not be placed on the wearing surface (top). Affix printed labels to two sides. RFID chips must be placed in accordance with system recommendations. RFID readers must be provided to the Contractor by the fabricator. All panels must be identifiable upon arrival at the job staging area or job site. Panels that are unidentifiable are cause for rejection.

Prevent cracking or damage during handling and storage of precast panels. Panels that sustain damage or surface defects during fabrication, handling, storage, transporting or installation are subject to review and rejection.

Any of the following conditions shall be cause for rejection of precast panels:

- Any cracks with crack widths greater than 0.004 inches.
- Voids or honeycombed areas.

All proposed repair procedures shall be in writing. Approval shall be obtained from the Engineer prior to performing the repairs. Repair work must reestablish the panel's structural integrity, durability and aesthetics to the satisfaction of the Engineer.

Failure to take corrective action to eliminate repetitive damage is cause for rejection of the additional damaged panels whether repaired or not.

Panels shall be fabricated to the following tolerances:

Precast panel dimensional tolerances shall comply with Table 4 – Dimensional Tolerances for Precast Panels.

**Table 4
Dimensional Tolerances for Precast Panels**

Panel Dimensions: Length & Width	± 1/4"
Panel Dimensions: Nominal Thickness	± 1/8"
Panel Dimensions: Squareness (diagonal difference @ top of panel)	± 3/16"
Horizontal Alignment	± 1/4"
Deviation from straightness of mating edge of panels	
Vertical Alignment – Camber, Horizontal Skew, and Vertical Batter	± 1/8"
Position of lifting anchors (horizontal location)	± 6.0"
Position of non-prestressed reinforcement (horizontal & vertical)	± 1/2"
Position of pre-tensioned strands & Tendon duct at shear key, if used (horizontal & vertical)	± 1/4"
Position of dowel bar inserts (horizontal & vertical)	± 1/4"
Dimensions of block outs & grout pockets	± 1/4"

Construction Methods:

A. Field Verification: The Contractor shall verify dimensions shown in the Contract Plans by field measurements. All necessary field information required for the fabrication and the installation of the precast panels shall be obtained prior to any preparation of the shop drawings and the installation plan. Any significant variation from the contract plans shall be reported to the Engineer.

B. Fabrication: Do not place concrete in the forms until the Engineer has inspected the placement of all materials within the pavement panels.

Panels shall be manufactured to the thickness shown and shall include additional thickness to provide for the required blanket milling post placement required under Subsection 501.03.11.3 Surface Corrections. A minimum clearance of reinforcement and embedded items shall remain 3.0 inches.

Cure the precast panels in accordance with ACI, PCI or the approved plant Quality Control Plan. Begin curing immediately following surface finishing. Curing shall continue until lifting strength is attained.

After curing, all form release material, curing material and any form material adhering to concrete surfaces shall be removed by power washing without causing damage to the surface.

Do not strip the form before the precast panels have attained a minimum compressive strength of 3,000 psi.

Top edges of precast panels shall be rounded with a hand stone to prevent chipping during handling and installation. No chamfering of panel top edges will be allowed.

All concrete surfaces which do not create a mechanical bond and are in contact with fill grout shall have an exposed aggregate finish. The roughened surface finish may be created by applying a retarder to the form work followed by power washing the unhydrated paste from the surface immediately after removal of the formwork or by abrasive basting of the surface prior to shipping.

Use lift devices cast into panels when lifting and moving panels at the fabrication plant and at the project site. Panel lifting stress calculations for typical and largest or any unique panels shall be provided in the shop drawing submittal.

Exposed surface finish shall be medium brushed or burlap drag texture.

- C. Placing Pavement Panels: The Contractor shall place the precast panels as shown in the approved installation plan.

Comply with the precast panel placement tolerances in Table 5 unless noted otherwise in the contract documents or accepted Pre-Installation Submittals.

- D. Installing Dowel Bars and Longitudinal Joint Ties: The Contractor shall install dowel bars and longitudinal joint ties as shown in the approved installation plan.

If allowed by the system designer specification and approved by the Engineer, in-place panels may be opened to traffic prior to bedding and encasement grout being placed.

- E. Placement of Bedding Grout and Encasement Grout: The Contractor shall place all grout as shown in the approved installation plan.

The Contractor shall verify that in-place panels that have been subjected to traffic loading are at correct grade and in compliance with the panel placement tolerances in Table 5 prior to grout placement.

Placement of dowel bar grout shall be completed within 48-hours of initial panel placement. If adverse weather delays grouting operations, complete as soon as weather permits. Place bedding grout after dowel bar grout and in the same work shift.

Construction traffic shall be kept off of panels after grouting and prior to opening to traffic.

**Table 5
Precast Panel Placement Tolerances**

Horizontal Alignment: Longitudinal centerline to surveyed centerline marked on the surface of the base and adjacent panels.	1/2" maximum
Transverse centerline to surveyed marks on adjacent panels	1/2" maximum
Vertical alignment: Top surface of precast panel with respect to top surface adjacent panels at any point	1/4 " maximum
Gap width at top surface between adjoining panels Note: Maintaining variable transverse joint width in excess of 1/2 inch will be cause for stoppage of panel installation operations until the Contractor states in writing how he plans to correct this deficiency.	1/2" maximum transverse 1/2" maximum longitudinal

Method of Measurement:

The quantity for "Precast Concrete Pavement" will be measured as the number of square yards installed and accepted. The area will be computed based on the plan dimensions as shown on the contract plans. Removal, repair and reconstruction of base material will be measured for payment separately in accordance with Section 501. Fine Grading or base adjustments up to 2" in depth are considered incidental and shall consist of proposed base materials or in the absence of a proposed base material the material shall meet or exceed Select Borrow in accordance with Section 301.

Basis of Payment:

The work is composed of survey, design, fabrication and materials, transportation of panels and materials, removal of existing pavement including any associated saw cutting, base adjustments, placement of bedding material, grouting as required, diamond grinding of the pavement surface, joint sealing, clean up and placement of temporary pavement transitions as applicable to the contract.

The payment for "Precast Concrete Pavement" will be at the Contract unit price bid per square yard. Price and payment will constitute full compensation for survey, design, fabrication and materials, transportation of panels and materials, removal of existing pavement including any associated saw cutting, base adjustments, placement of bedding material, grouting as required, diamond grinding and for furnishing all equipment, tools, labor, and incidentals required to complete the work.

All temporary marking shall be installed using a State approved solvent based paint. Alternative temporary markings will only be allowed by approval of the Engineer and shall be fully removed prior to diamond grinding of the final surface.

3/27/2019

501511 - RUBBLIZING PORTLAND CEMENT CONCRETE PAVEMENT

Description:

This work consists of rubblizing and compacting the existing Portland Cement Concrete Pavement in accordance with the locations and details on the Plans and as directed by the Engineer. This work may also require the use of filler aggregate to adjust and/or correct grades as directed by the Engineer.

Materials:

Aggregate filler used to fill voids and depressed areas shall be crushed concrete meeting the requirements of Delaware #57, #67, or #8 Stone listed in Section 1004 of the Standard Specifications.

Equipment:

The existing pavement shall be rubblized with a self-contained, self-propelled multi-head breaker. The equipment shall have the capability of rubblizing the pavement the full width of the pavement lane in a single pass. The unit shall also be equipped with a water system to suppress dust generated by the rubblizing operation.

The Z-pattern steel grid roller shall be a vibratory smooth steel wheel roller with a Z-pattern grid cladding bolted to the surface of the drum, and have a minimum gross weight of 10 tons capable of further breaking the larger pieces of concrete to the required sizes.

Unless otherwise noted on the Plans, the Contractor may utilize the resonant frequency pavement breaker as an alternate to the multi-head breaker. As specified above, a water system to suppress dust is also required for this equipment.

The pneumatic-tired rollers shall have a minimum gross weight of 26 tons. It shall develop a tire pressure meeting the recommendation of the manufacturer.

Concrete Saw shall be capable of cutting Portland Cement Concrete Pavement and any load transfer devices.

Construction Methods:

The rubblized concrete pieces shall meet the following required standards:

Plain Concrete:

3" max. at top surface
9" max. at bottom surface

Reinforced Concrete:

3" max at top surface
12" max. at bottom surface

Prior to the acceptance of the rubblizing procedure to be used, the Contractor shall complete a "test strip" for calibration of all rubblization variables, such as velocity, frequency, force, shoe size, concrete and subgrade conditions, and for evaluation by the Engineer. This test strip shall be performed between a joint section (min. 60 feet). This test strip is to ensure that Contractor's procedure is capable of rubblizing the concrete to the required sizes and maintaining the stability of the subgrade. Where concrete pavement or other concrete appurtenances are to remain in place, a full-depth saw cut shall sever the existing pavement, joints, and reinforcement. For jointed pavements, this saw cut shall be at an existing joint. Rubblized pavement dislodged by construction traffic shall be repaired prior to the paving operation. The cost of repair shall be incidental to this item. The breaker shall be operated to avoid damaging the base and underlying structures. If damage occurs to the base or underlying structures, it shall be repaired at the Contractor's expense.

Unless otherwise directed by the Plans or Engineer, a minimum of 2 weeks prior to the rubblization, an adequate subgrade drainage system should be installed as directed by the notes and details on the Plans. Payment to be as per respective bid items. Prior to rubblizing, all bituminous concrete overlays, bituminous concrete patches, and loose materials shall be removed from the Portland Cement Concrete Pavement. The operating speed of the pavement breaker shall be such that the existing pavement is reduced into the required sizes. All rubblized concrete pieces larger than the required sizes shall be broken by further measures such as vibratory Z-patterned steel grid roller or hydraulic jackhammer or shall be removed and replaced with aggregate filler. The Contractor may, upon approval by the Engineer, schedule any widening and/or shoulder work prior to rubblizing in order to stabilize and support the free edge.

Reinforcement shall be left in place except for that reinforcement exposed at the surface during rubblizing or compaction, which shall be cut below the surface and removed. All joint sealant material, loose joint filler, expansion material, or other similar items shall be removed from the rubblized pavement.

The Contractor shall continuously monitor the rubblization operation immediately behind the equipment and shall make adjustments to the equipment such as the striking pattern, striking energy, operating frequency, velocity, or other factors as necessary to continuously achieve acceptable breaking for the project. The Contractor shall schedule the rubblization process to avoid any possible forecast of rain.

To ensure the pavement is rubblized to the required sizes, the Contractor shall excavate a test hole of nine (9) square feet of rubblized material every 1500 feet for inspection, or after any change in the operation such as equipment repairs or where condition of the pavement changes or as directed by the Engineer. Excavation in these areas shall remove the top material to expose the bottom layer. While doing inspection, if the sizes of the rubblized concrete deviate from the required sizes, the Engineer may require another "test strip" after corrections/adjustments are made in the process.

All damage to drainage/utility pipes, conduits, valve boxes, manholes or other fixtures, existing and proposed, resulting from the rubblizing effort shall be repaired or replaced, as approved by the Engineer, at the Contractor's expense. The Contractor has the option of adjusting the rubblization equipment or using an alternate rubblization method adjacent to fixtures or above pipe. In lieu of rubblizing, the pavement adjacent to fixtures, conduits, or above drainage/utility pipes may be removed and the resulting void filled with filler aggregate.

Prior to placing the surface course(s), the complete width of the rubblized pavement shall be further rubblized and compacted by vibratory steel wheel and pneumatic-tired rollers in the following sequence:

After rubblizing:

2 passes with a vibratory roller fitted with a Z-pattern grid on the roller face.

1 pass with a pneumatic-tired roller.

Immediately prior to overlay:

1 pass with a vibratory steel wheel roller.

A single pass shall consist of the coverage of a fixed point twice, once up and once back.

Any depression, ½ inch or greater in depth from that of the immediate surrounding area, resulting from the rubblizing or compacting effort, shall be filled with filler aggregate and compacted with the roller. Maximum operating speed of the roller shall not exceed six (6) feet per second. Depending on the depth of the depression, the filler aggregate shall meet the size requirement of Delaware #57, #67, or #8 Stone as directed by the Engineer.

Except at restricted crossover and ramp crossings, traffic shall not be allowed on the rubblized pavement prior to placement of the overlay course. Crossover and ramp crossings shall be maintained in the same compactive state as other areas until the overlay course is in place.

When the rubblized concrete pavement is to be overlaid with bituminous hot-mix, a tracked paver shall be used to place the first lift of bituminous materials over the prepared rubblized Portland Cement Concrete.

To ensure stability of the rubblized pavement, after compaction, a fully-legally loaded tandem axle dump truck shall be slowly run across the rubblized base. Any areas of weakness noticed by pumping shall be removed and replaced with filler material.

Method of Measurement:

The quantity of P.C.C. pavement rubblized will be measured as the number of square yards of existing P.C.C. pavement rubblized and accepted.

Basis of Payment:

The quantity of P.C.C. pavement rubblized will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for rubblizing, furnishing and placing aggregate filling, compacting, and repairing the P.C.C. pavement as described herein, for all labor, tools, materials, and necessary equipment to complete the work.

3/27/2019

602505 - PERSONAL SAFETY GRATE

Description:

This work consists of furnishing all materials, fabricating, delivering and constructing personnel grates for pipe inlets in accordance with the Standard Details, at locations as shown on the Plans, as directed by the Engineer and as required by these Special Provisions.

Materials:

Materials shall conform to the requirements of Sections 601 and 611 and shall be galvanized in accordance with Subsection 1039.10 including all rebar, hardware and fasteners as shown on the Standard Details.

Working drawings shall be submitted in accordance with Subsection 105.04.

Construction Methods:

Personnel grates for pipe inlets shall be constructed based on the Standard Details and at the size and locations shown on the Plans.

Method of Measurement:

The number of inlet grates to be paid for under this item shall be the actual number of inlet grates installed and accepted.

Basis of Payment:

The quantity of personal grate for pipe inlet will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing, hauling and installing materials, including bar reinforcement; lock, for excavating including removal and disposal of existing end sections, backfilling, and compacting; for cribbing, shoring, sheeting, coating, and paving; and for all labor, materials, equipment, tools, and incidentals required to complete the work. Design services for the personnel grate for pipe inlet including the preparation and submittal of working drawings shall be incidental to this item.

8/27/2018

607500 - SOIL NAIL WALL

Description:

This work consists of constructing a permanent soil nail wall as specified herein and as shown on the Plans. The Contractor shall furnish all labor, materials, and equipment required to complete the work.

The work shall include performing the following activities in accordance with the design plans, the required submittals by the Contractor and these specifications: excavating in staged lifts drilling of the soil nail drill-holes to the diameter and length required per plans; grouting of soil nails; supplying and installing the specified drainage features; supplying and installing bearing plates, washers, nuts, and other required hardware and miscellaneous materials; and constructing the initial and final soil nail wall facing.

Materials:

Facing

Facing materials shall conform to the following sections and subsections.

Shotcrete Facing

Shotcrete facing shall meet the requirements of Section 24, "Pneumatically Applied Mortar" of the AASHTO LRFD Bridge Construction Specifications, 3rd Edition with 2016 Interim Revisions.

Shotcrete: $f_c' = 4.0$ ksi.

Cast-in-place Concrete

Cast-in-place (CIP) concrete shall meet the requirements of Section 610 of the DelDOT Standard Specifications.

Concrete: Class A - $f_c' = 4.5$ ksi

Reinforcing Steel

Reinforcing steel shall meet the requirements of Section 1037 of the DelDOT Standard Specifications.

Architectural Surface Finishes

Architectural surface finishes may include textured surfaces or a surface finish with color/stain application.

Soil Nails

Soil Nail Solid Bar

Solid nail bars shall meet the requirements of AASHTO M31/ASTM A615 for Grade 75 steel bars, and ASTM A 722 for Grade 150 steel. Soil nail bar shall be continuous without splices or welds, new, straight, undamaged, epoxy coated or galvanized as shown on the Plans. The length of the threaded portion of the bar at the wall anchorage shall be as needed to allow proper attachment of the bearing plate and nut. If threads are cut into a soil nail bar, the contractor shall verify that the bar meets the minimum capacity required at the threaded section.

Bar Couplers

Bar couplers shall develop the full nominal tensile capacity of the soil nail bars as certified by the manufacturer.

Fusion Bonded Epoxy Coating

Fusion bonded epoxy coating shall meet the requirements of ASTM A 775 and have a minimum thickness of 12 mils (12 thousandths of an inch) as applied electrostatically. Bend test requirements are waived.

Zinc Coating

Zinc galvanized coating shall meet the requirements of Article 11.10.6.4.2a (AASHTO LRFD Bridge Design Specifications, 7th edition with 2015 and 2016 Interim Revisions) and have a minimum of 2.0 oz/ft² or 3.4 mil thickness applied in accordance with ASTM A123 for bars and structural steel shapes, and ASTM A153 for nuts, plates, and other hardware.

Other Soil Nail Components

Centralizers

Centralizers shall be manufactured from Schedule 20 or 40 PVC pipe or tube, steel, or other materials not detrimental to the soil nail steel bar. Wood shall not be used. Centralizers shall be securely attached to the soil nail bar and shall be sized to allow: (a) positioning of the soil nail bar within 1 in. of the center of the drill-hole; (b) tremie pipe insertion to the bottom of the drill-hole; and (c) grout to freely flow up the drill-hole. They shall be installed at regular intervals not to exceed 10 ft along the length of the nail and a distance of 1.5 ft from each end of the nail.

Grout

Grout shall be a neat cement or sand/cement mixture with a minimum 3 day compressive strength of 1,500 psi and a minimum 28 day compressive strength of 3,000 psi, meeting the requirements of AASHTO T106/ASTM C109. The specific gravity of the freshly prepared neat cement grout shall range between 1.8 and 1.9.

Sand

Sand for grout and/or shotcrete shall meet the requirements of AASHTO M6/ASTM C33.

Portland Cement

Portland cement for grout and/or shotcrete shall meet the requirements of AASHTO M85/ASTM C150, Type I, II, III, V, or Type I/II.

Admixtures

Admixtures shall meet the requirements of AASHTO M194/ASTM C494. Admixtures shall be compatible with the grout and mixed in accordance with the manufacturer's recommendations. Accelerators shall not be permitted. Expansive admixtures shall not be permitted except where the grout is used as part of corrosion protecting encapsulation.

Film Protection

Polyethylene film for moisture loss control shall meet the requirements of ASTM C171.

Connection Components

Bearing Plates

Bearing plates shall meet the requirements of ASTM A709 Grade 50.

Nuts

Nuts shall meet the requirements of ASTM A563, Grade B, hexagonal, and fitted with beveled washer or spherical seat to provide uniform bearing.

Shear Connectors

Shear connectors of the soil nail head shall consist of headed-studs or anchor bolts.

Welded-Wire Mesh

Welded wire mesh (WWM) shall meet the requirements of AASHTO M55/ASTM A185 or A497.

Geocomposite Strip Drain

Geocomposite strip drain shall be manufactured with a drainage core (e.g., geonet) and a filtration geotextile attached to or encapsulating the core. Drainage core shall be manufactured from long-chain synthetic polymers composed of at least 85 percent by mass of polypropylenes, polyester, polyamine, polyvinyl chloride, polyolefin, or polystyrene and have a minimum compressive strength of 40 psi when tested in accordance with ASTM D 1621 Procedure A. The drainage core with the geotextile fully encapsulating the core shall have a minimum flow rate of 0.1 gallons per second per foot of strip width under a gradient of 1.0 tested in accordance with ASTM D 4716.

Underdrain and Perforated Pipe

Pipe

Underdrain and perforated pipe shall meet the requirements of ASTM D1785 Schedule 40 PVC solid and perforated wall; cell classification 12454-B or 12354-C, wall thickness SDR 35, with solvent weld or elastomeric joints.

Fittings

Fittings for underdrain and perforated pipe shall meet the requirements of ASTM D3034, Cell classification 12454-B or C, wall thickness SDR 35, with solvent or elastomeric joints.

Initial Shotcrete

All materials, methods, and control procedures for initial shotcrete shall be submitted to the Owner's Engineer for review and approval.

CONTRACTOR QUALIFICATIONS

The soil nailing contractor shall meet the following qualification requirements:

1. Have completed at least three permanent soil nail wall projects during the past three years totaling at least 10,000 ft² of soil nail wall face area and at least 500 permanent soil nails.
2. Provide on-site supervisors and drill operators with experience installing permanent soil nail walls on at least three projects over the past three years.

3. Submit a brief description of at least three projects, including the owner agency's name, address, and current phone number; location of project; project contract value; and scheduled completion date and completion date for the project.

SUBMITTALS

Personnel

At least 30 calendar days before starting soil nail work, submit names of the Engineer, on-site supervisors, and drill operators assigned to the project, and a summary of each individual's experience. Only those individuals designated as meeting the qualifications requirements shall be used for the project. The Contractor cannot substitute for any of these individuals without written approval of the Owner or the Owner's Engineer. Work shall not be started nor materials ordered until the Contractor's qualifications have been approved by the Owner's Engineer. The Owner's Engineer may suspend the work if the Contractor substitutes unqualified personnel for approved personnel during construction. If work is suspended due to the substitution of unqualified personnel, the Contractor shall be fully liable for all additional costs resulting from the suspension of work, and no adjustment in contract time resulting from the suspension of the work shall be allowed.

Surveys

The Contractor shall be responsible for providing the necessary survey and alignment control during the excavation for each lift, locating drill holes and verifying limits of the soil nail wall installation.

Construction Plan

At least 45 days before starting soil nail work, the Contractor shall submit a Construction Plan to the Owner's Engineer that includes the following:

1. Project start date and proposed detailed wall construction sequence.
2. Drilling and grouting methods and equipment, including the drill hole diameter proposed to achieve the specified nominal pullout resistance values shown on the Plans.
3. Nail grout mix design, including compressive strength test results (per AASHTO T106/ASTM C109) supplied by a qualified independent testing lab verifying the specified minimum 3-day and 28-day grout compressive strengths. For neat cement grout include specific gravity test results of the fresh grout used for compressive testing.
4. Nail grout placement procedures and equipment.
5. Shotcrete facing materials and methods, including mix and anticipated strength.
6. Soil nail testing methods and equipment setup.
7. Identification number and certified calibration records for each test jack, pressure gauge, dial gauge and load cell to be used. Jack and pressure gauge shall be calibrated as a unit. Calibration records shall include the date tested, the device identification number, and the calibration test results and shall be certified for an accuracy of at least 2 percent of the applied certification loads by a qualified independent testing laboratory within 90 days prior to submittal.
8. Manufacturer Certificates of Compliance for the soil nail ultimate strength, nail bar steel, Portland cement, centralizers, bearing plates and epoxy coating.
9. Approval of the Construction Plan does not relieve the Contractor of his responsibility for the successful completion of the work.

At least 45 days before the planned start of the wall excavation, the Contractor shall submit shop drawings to the Owner's Engineer for review and approval. Include all details, dimensions, quantities, ground profiles and cross-sections necessary to construct the wall. The Contractor shall verify the limits of the wall and ground survey data before preparing the shop drawings. The working drawings shall be prepared to the

DelDOT standards. The Contractor shall not begin construction or incorporate materials into the work until the submittal requirements are satisfied and found acceptable to the Owner's Engineer.

STORAGE AND HANDLING

Soil nail bars shall be stored and handled in a manner to avoid damage or corrosion. Soil nail bars exhibiting abrasions, cuts, welds, weld splatter, corrosion, or pitting shall be replaced. Bars exhibiting damage to epoxy coating shall be repaired or replaced at no additional cost. Repaired epoxy coating areas shall have a minimum 0.012-in. thick coating. Damaged galvanization shall be repaired by coating the damaged area with a field grade, zinc-rich paint.

EXCAVATION

The height of exposed unsupported final excavation face cut shall be established by contractor and shall not exceed the vertical nail spacing plus the required reinforcing lap or the short-term stand-up height of the ground, whichever is less. Excavation to the final wall excavation line and shotcrete application shall be completed in the same work shift, unless otherwise approved by the Owner's Engineer.

Excavation of the next-lower lift shall not proceed until soil nail installation, reinforced shotcrete placement, attachment of bearing plates and nuts, and nail testing have been completed and accepted in the current lift. Nail grout and shotcrete shall have attained at least their specified 3-day compressive strength before excavating the next underlying lift.

SOIL NAIL INSTALLATION

The soil nail length and drill hole diameter necessary to develop the load capacity and to satisfy the acceptance criteria for the design load required shall be provided, but not less than the lengths or diameters shown in the Plans.

Drill holes for the soil nails shall be drilled at the locations, elevations, orientations, and lengths shown on the Plans. The drilling equipment and methods shall be selected to be suitable for the ground conditions and in accordance with the accepted installation methods submitted by the Contractor. If caving ground is encountered, cased drilling methods shall be used to support the sides of the drill-holes. Soil nail bars shall be provided as shown in the Plans.

Centralizers shall be provided and sized to position the soil nail bars to within 1 in. of the center of the drill hole. Centralizers shall be positioned as shown on the Plans so that their maximum center-to-center spacing does not exceed 10 ft, and shall be located to within 1.5 ft from each end of the nail bar.

GROUTING

The drill hole shall be grouted after installation of the soil nail bar and within 2 hours of completion of drilling. The grout shall be injected at the lowest point of each drill-hole through a grout tube, casing, hollow-stem auger, or drill rods. The outlet end of the conduit shall deliver grout below the surface of the grout as the conduit is withdrawn to prevent the creation of voids. The drill hole shall be filled in one continuous operation. Cold joints in the grout column shall not be allowed except at the top of the test bond length of proof tested production nails. The space above the bottom elevation of the inclined drill hole opening called a "bird's beak" due to its shape, shall be filled up with additional grout after a temporary cover is placed in front of the drill hole, or filled with shotcrete.

Final grout for hollow bar soil nails must meet the same specific gravity and strength requirements as for solid bars listed previously. Drilling grouts may have a specific gravity of 1.4 to 1.6. After the bar is installed to the desired depth, the final grout shall have a specific gravity of 1.8 to 1.9 as measured from the grout return at the top of the drill hole.

SOIL NAIL TESTING

Tests

The Contractor shall perform both verification and proof testing of designated test soil nails. Verification tests on sacrificial test nails shall be conducted at locations shown on the Plans. Proof tests on production nails shall be conducted at locations selected by the Owner's Engineer. Testing of any nail shall not be performed until the nail grout and shotcrete facing have attained at least their specified 3-day compressive strength.

Refer to FHWA Geotechnical Circular No. 7 "Soil Nail Walls" for detailed guidance on soil nail testing.

Verification Testing

The Contractor shall perform a number of verification tests on sacrificial soil nail as established in the project plans. Verification testing shall be conducted prior to installation of production soil nails on sacrificial soil nails to confirm the appropriateness of the Contractor's drilling and installation methods, and verify the required nail pullout resistance.

The Design Load during the verification tests (DL) shall be calculated based on as-built bonded lengths per FHWA Geotechnical Circular No. 7 "Soil Nail Walls."

Proof Testing

Successful proof testing shall be demonstrated on at least 5 percent of production soil nails in each nail row or a minimum of one per row. The Owner's Engineer shall determine the locations and number of proof tests prior to nail installation in each row.

The Design Load during the proof tests (DL) shall be calculated based on as-built bonded lengths per FHWA Geotechnical Circular No. 7 "Soil Nail Walls."

ACCEPTANCE CRITERIA

A test nail shall be considered acceptable when all of the following criteria are met:

1. For verification tests, the total creep movement is less than 0.08 in. between the 6- and 60-minute readings, and the creep rate is linear or decreasing throughout the creep test load hold period.
2. For proof tests, the total creep movement is less than 0.04 in. during the 10-minute readings or the total creep movement is less than 0.08 in. during the 60-minute readings, and the creep rate is linear or decreasing throughout the creep test load hold period.
3. For verification and proof tests, the total measured movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length of the test nail.
4. A pullout limit state does not occur at $2.0 \times DL$ under verification testing and $1.5 \times DL$ test load under proof testing. Pullout limit state is defined at a load level at which the test load cannot be further increased while there is continued pullout movement of the test nail. The load at the pullout limit state shall be recorded as part of the test data.
5. Maintaining stability of the temporary unbonded test length for subsequent grouting is the Contractor's responsibility. If the unbonded test length of production proof test nails cannot be satisfactorily grouted after testing; the proof test nail shall become sacrificial and shall be replaced with an additional production nail installed at no additional cost to the Owner.

6. Material for soil nail retaining walls will be accepted based on the manufacturer production certification or from production records. Construction of soil nail retaining walls will be accepted based on visual inspection and the examination of relevant production testing records by the Owner's Engineer.

REJECTION OF TEST SOIL NAILS

Verification Test Soil Nails

The Owner's Engineer will evaluate the results of each verification test. Installation methods that do not satisfy the nail testing requirements shall be rejected. The Contractor shall propose alternative methods for review by the Owner's Engineer and shall install replacement verification test nails. Replacement test nails shall be installed and tested at no additional cost to the administration.

Proof Test Soil Nails

For proof test nails, the Owner's Engineer may require the Contractor to replace some or all of the installed production nails between a failed proof test soil nail and the adjacent passing proof test nail. Alternatively, the Owner's Engineer may require the installation and testing of additional proof test nails to verify that adjacent previously installed production nails have sufficient nominal pullout resistance. Installation and testing of additional proof test nails or installation of additional or modified nails as a result of proof test nail failure(s) shall be at no additional cost to the administration.

WALL DRAINAGE NETWORK

All elements of the soil nail wall drainage network shall be installed and secured as shown on the Plans. The drainage network shall consist of geocomposite drain strips, PVC connection pipes, soil nail wall footing drains, and weep holes, as shown on the Plans. Exclusive of the wall footing drains, all elements of the drainage network shall be installed prior to shotcreting.

Geocomposite Drain Strips

Geocomposite drain strips shall be centered between the columns of soil nails, as shown on the Plans. Drain strips shall be at least 12 in. wide and placed with the geotextile side against the ground. Strips shall be secured to the excavation face. Contamination of the geotextile with shotcrete shall be prevented. Drain strips shall be vertically continuous.

Footing Drains

Footing drains shall be installed at the bottom of the wall, as shown on the Plans. The drainage geotextile shall envelope the footing drain aggregate and pipe and shall conform to the dimensions of the trench. The drainage geotextile shall overlap on top of the drainage aggregate as shown on the Plans. Damaged or defective drainage geotextile shall be repaired or replaced.

SHOTCRETE FACING

Initial shotcrete facing shall be provided as shown in the plans. Where shotcrete is used to complete the top ungrouted zone of the soil nail drill-hole near the face, the nozzle shall be positioned into the mouth of the drill-hole to completely fill the void.

Attachment of Nail Head Bearing Plate and Nut

A bearing plate, washers, and nut shall be attached to each nail head as shown on the Plans. While the shotcrete construction facing is still plastic and before its initial set, the plate shall be uniformly seated on the shotcrete by hand-wrench tightening the nut. Where uniform contact between the plate and the shotcrete cannot be provided, the plate shall be set in a bed of grout. After grout has set for 24 hours, tighten the nut

by hand with a wrench. The bearing plates with headed studs shall be located within the tolerances shown on the Plans.

Shotcrete Facing Tolerances

Construction tolerances for the shotcrete facing from plan location and plan dimensions shall be as follows:

Horizontal location of welded wire mesh; reinforcing bars, and headed studs: 0.4 in.

Location of headed-studs on bearing plate: 1/4 in.

Spacing between reinforcing bars: 1 in.

Reinforcing lap: 1 in.

Complete thickness of shotcrete:

- If troweled or screeded: 0.6 in.
- If left as shot: 1.2 in.

Planeness of finish face surface-gap under 10-ft straightedge:

- If troweled or screeded: 0.6 in.
- If left as shot: 1.2 in.

Nail head bearing plate deviation from parallel to wall face: 10 degrees

REINFORCING STEEL

The Contractor shall submit all order lists and reinforcement bending diagrams to the Owner's Engineer, and shall fabricate reinforcing steel, ship and protect material, place, fasten, and splice reinforcing steel as required by the Plans.

STRUCTURAL CONCRETE

The Contractor shall design the concrete mix, store, handle, batch, and mix material and deliver concrete, provide quality control, and construct concrete facing to meet the specified resistance.

ARCHITECTURAL SURFACE FINISHES

Textured form liners shall be furnished, form liners installed, and a surface finish (color/stain application) applied that will duplicate the architectural surface finish shown on the Plans. The Contractor shall submit detailed drawings of the form liner for approval by the Owner's Engineer at least 7 days before form liner work begins. Before production work begins, a 3-ft high, by 1.5-ft wide, by 10-ft long test panel shall be constructed on site using the same forming methods, procedures, form liner, texture configuration, expansion joint, concrete mixture and color/stain application proposed for the production work.

BACKFILLING BEHIND WALL FACING UPPER CANTILEVER

If backfilling is required behind an extension of the wall facing at the top of a soil nail wall, compaction of the soil backfill performed within 3 ft of the wall extension shall be performed using light mechanical tampers.

ACCEPTANCE

Material for soil nail retaining walls will be accepted based on the manufacturer production certification or from production records. Construction of soil nail retaining walls will be accepted based on visual inspection and the examination of relevant production testing records by the Owner's Engineer.

MEASUREMENT AND PAYMENT

SOIL NAILS

Production soil nails shall not be measured and shall be incidental to "Soil Nail Wall" item. No separate measurement will be made for pullout test nails, which shall be considered incidental to "Soil Nail Wall" item.

STRUCTURE EXCAVATION

Structure excavation for the soil nail wall shall not be measured and shall be incidental to "Soil Nail Wall" item. No measurement will be made for using temporary stabilizing berms.

WALL FACE

The wall face of soil nail walls shall not be measured and shall be incidental to "Soil Nail Wall" item. No measurement or payment will be made for additional shotcrete or CIP concrete needed to fill voids created by irregularities in the cut face, excavation overbreak or inadvertent excavation beyond the Plan final wall face excavation line, or failure to construct the facing to the specified line and grade and tolerances.

Method of Measurement:

Payment for soil nail wall will not be measured but paid for at the contract lump sum price for "Soil Nail Wall" item.

Basis of Payment:

The quantity for soil nail will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing, soil nail solid bars, bearing plates, nuts, shear connectors, welded-wire mesh, reinforcing steel, concrete for shotcrete and cast-in-place facing and all incidental expenses including all materials, equipment, tools, and labor incidental thereto, furnishing material and labor for excavation for soil nail wall, furnishing material and labor for #57 stone backfill material, riprap slope protection, hauling and disposal of excavated material, installing drainage system behind the wall including DE No. 3 stone, soil nail pullout testing and incidentals required to complete the work.

4/7/17

610500 - ULTRA HIGH PERFORMANCE CONCRETE

Description:

This specification consists of mixing, transporting, placing, finishing, curing and grinding of Ultra High Performance Concrete (UHPC) for use in connections between precast structural elements in accordance with the details and notes in the Contract Documents and as directed by the Engineer. UHPC is a cementitious composite material composed of an optimized gradation of granular constituents, a water-to-cementitious materials ratio less than 0.25 and a high percentage of discontinuous internal fiber reinforcement.

Materials:

Commonly used materials are as follows. All materials must come from the same batch or lot.

- (a) *Fine Aggregate* - Crushed Quartz with 100 % passing the No. 30 sieve and a maximum of 3% passing the No. 200 sieve.
- (b) *Cementitious Material* - Section 801 - Portland Cement and Blended Hydraulic Cements.
- (c) *Steel Fibers* - ASTM A 820, Type 1, cold drawn high-carbon steel with a minimum tensile strength of 300 ksi. Minimum steel fiber content shall be 2% of the mix's dry volume.
- (d) *Water* - Section 803 - Water for Mixing Portland Cement.
- (e) *Admixtures* - Only as directed by the manufactures representative.

The UHPC mixture shall meet the conditions listed in Table 1: UHPC Material Properties after 28 days, unless otherwise noted in the Contract Documents or as directed by the Engineer. Material properties listed below shall be verified by the manufacturer and submitted for approval in the Placement Plan.

Table 1: UHPC Material Properties		
Description	Test Method	Acceptance Criteria
Compressive Strength <i>Ends of cylinders must be ground flush prior to testing. Saw cutting, capping, and use of neoprene pads are not permitted.</i>	AASHTO T 22 (3"x6" cylinders) (150 psi/sec loading rate)	22 ksi after 28 days
Shrinkage	AASHTO T 160 / ASTM C 157	800 micro-strain
Rapid Chloride Ion Penetrability or Surface Resistivity Testing	AASHTO T 277 / ASTM C 1202 or AASHTO TP 95	350 coulombs
Chloride Ion Penetrability	AASHTO T 259 (1/2" depth)	< 0.1183 lbs/yd ³
Scaling Resistance	ASTM C 672	Y < 3
Freeze-Thaw Resistance	AASHTO T 161 / ASTM C 666A (300 cycles)	Relative Dynamic Modulus of Elasticity > 95%
Alkali-Silica Reaction	ASTM C 1567 (Modified)	≤ 0.08% at 28 days
Slump Flow and Visual Stability	ASTM C1437 / ASTM C 1611	7 inches (Minimum) 10 inches (Maximum) No bleed water Consistent fiber distribution

At least 60 days prior to the placement of UHPC, submit a prepackaged batch of dry ingredients and admixtures sufficient for the Department to make a one cubic foot trial batch of UHPC. Any testing for alkali-silica reaction or permeability will be performed on specimens without steel reinforcement. Batch

proportions shall otherwise remain the same per the prepackaged blend and water to cementitious materials ratio (w/cm).

Construction Methods:

(A) Storage: Assure proper storage of all materials including but not limited to cement, aggregate, steel reinforcement and additives, as required by the supplier's recommendation in order to protect the integrity of the materials against the loss of physical and mechanical properties.

(B) Placement Plan: Submit a Placement Plan with a detailed construction work schedule to the Engineer for review at least 10 days prior to the scheduled UHPC placement pour. The Placement Plan shall address at a minimum:

The following list is intended as a guide and may not address all of the means and methods the Contractor may elect to use. The Contractor is expected to assemble a comprehensive list of all necessary items for executing the placement of UHPC.

- Responsible personnel and hierarchy.
- Equipment – including but not limited to pumps, hoses, mixers, holding tanks, wheelbarrows, scales, meters, thermometers, floats, screeds, burlap, plastic, heaters, blankets, etc.
- Quality Control of batch proportions - including dry ingredients, steel fibers, water and admixtures.
- Quality Control of mixing time and batch times.
- Batch procedure sequence.
- Form work – including materials and removal.
- Placement procedure – including but not limited to surface preparation (comprising of exposed aggregate surface finish along precast elements and pre-wetting the precast concrete interface to a saturated-surface-dry (SSD) condition before the placement of UHPC), spreading, finishing, and curing protection. Include provisions for acceptable ambient conditions and batch temperatures and corrective measures as appropriate. Include means and methods to ensure all air is displaced by the UHPC and the void is completely filled.
- Threshold limits for ambient temperature, ambient relative humidity, batch consistency, batch temperature, batch times and related corrective actions.
- Construction joints, if needed, within the UHPC should be detailed and approved by the Engineer.
- Means and methods for water containment and clean up, for pre-wetting and for watertight integrity testing.

Arrange for a meeting between the UHPC manufacturer's representative, the Contractor's staff, and representatives from DelDOT Bridge Design, Construction, and Materials and Research to review the Contractor's Placement Plan. No UHPC pour will be permitted until the aforementioned Placement Plan has been submitted by the Contractor and approved by the Engineer.

Pumping of UHPC is not allowed.

Submit calculations and detailed drawings of the formwork, signed and sealed by a Professional Engineer registered in the State of Delaware. The design and fabrication of forms shall be consistent with the installation drawings and shall follow the recommendations of the UHPC manufacturer. Refer to Section C of the Construction Methods for additional requirements.

Construction loads applied to the bridge during UHPC placement and curing are the responsibility of the Contractor. Submit the weight and placement of concrete buggies, grinding equipment or other significant construction loads for review as part of the proposed Placement Plan.

(C) Forming, Mixing, Transporting, Placing and Curing: Design and fabricate formwork to adhere to Section 604.03.2 of the Delaware Standard Construction Specifications and the recommendations of the UHPC manufacturer. Construct forms from nonabsorbent material that are properly sealed and capable of resisting the hydrostatic pressures from UHPC in the unhardened state. Do not remove formwork until a compressive strength of 10 ksi is achieved. Internal vibration of the UHPC is not acceptable. However, rodding may be satisfactory to achieve a suitable blended connection where two successive pours meet.

All UHPC joints shall be covered by a top form with a moisture barrier. Supplemental heat can be provided to the UHPC and surrounding prefabricated elements to reduce initial set times and accelerate strength gain. The proposed method of artificial heating the precast concrete element shall be included in the installation drawings. Follow the UHPC manufacturer's recommendations for curing to attain the required strength to meet the project schedule.

Once the UHPC reaches a compressive strength of 10 ksi, the top forms of the joint may be removed to facilitate grinding of the joint to be even with the top surface of precast concrete element.

Forming, batching, placing, and curing shall be in accordance with the UHPC manufacturer's recommendations and as submitted and accepted by the Engineer.

Representatives of the UHPC manufacturer knowledgeable in supplying, mixing, transporting, placing, finishing and curing of the UHPC material must be present during mixing, transporting and placing of the UHPC. The Contractor shall arrange for two manufacturer's representatives to be on site for the duration of the UHPC construction; one representative will remain with the mixing operations and the second representative will remain with the placement operations. Do not start mixing or placing UHPC until the manufacturer's representatives are on-site. Place UHPC in accordance with the approved Placement Plan using one continuous pour unless otherwise detailed in the Contract Documents or as approved per the Placement Plan. UHPC should not freeze before attaining a compressive strength of 10 ksi.

Provide a minimum of two portable batching units for mixing of the UHPC. Mixing equipment which is not supplied by the UHPC manufacturer, must be reviewed by the UHPC manufacturer for adequacy. During batching keep the temperature of the UHPC below 90 degrees F; ice may be added to the mix as recommended by the UHPC manufacturer's representative.

The Contractor shall arrange for an on-site meeting with the UHPC manufacturer's representative one day before the start of the actual UHPC placement. The Contractor's staff and representatives from DelDOT Bridge Design, Construction, and Materials and Research, shall attend the meeting. The objective of the meeting will be to clearly outline the procedures for mixing, transporting, finishing and curing of the UHPC.

(D) Acceptance Testing: DelDOT Materials and Research will be on site during the placement of UHPC. To schedule a representative, contact DelDOT Materials and Research a minimum of 48 hours prior to the anticipated UHPC placement. A representative from the Materials and Research section will perform a slump flow test according to ASTM C 1437 / ASTM C 1611 on each batch of UHPC. DelDOT Materials and Research will cast 3"x6" cylinders according to AASHTO T 23 at a minimum of once per day. Cylinders shall be cast in a single lift. Compressive strength testing will be performed at 1, 2, 3, 4 and 28 day cure times. Final acceptance will be based upon 4 day and 28 day strengths. Field coring of UHPC for dispute resolution will not be allowed.

Additional specimens will be cast for permeability testing. A minimum of two lots will be selected at random from the permeability specimens and tested in accordance with AASHTO T 277 / ASTM C 1202 and AASHTO TP 95. In the event of a discrepancy between the two methods, results from ASTM C 1202 shall supersede. If one specimen from either lot exceeds the maximum permeability, two additional specimens will be selected and tested in accordance with AASHTO T 277 / ASTM C 1202, the average of which will replace the failed specimen result.

The Contractor is responsible for providing an adequate location to place acceptance specimens for initial curing prior to transport to the lab. Curing boxes will be equipped with supplemental heat or cooling as necessary to cure specimens in accordance with ASTM C 31. Testing performed by the DeIDOT Materials and Research has been summarized in Table 2: DeIDOT M&R UHPC Acceptance Testing. Performance frequencies of each test listed in Table 2, are a minimum value. Tests may be performed at more frequent intervals than described in Table 2, at the discretion of the Engineer or DeIDOT Materials and Research division.

Description	Test Method	Acceptance Criteria	Frequency
Compressive Strength	AASHTO T 22	22 ksi after 28 days 14 ksi after 4 days (3"x6" cylinders) (150 psi/sec loading rate)	At least once per 25 CY or once per 12 hour shift
Rapid Chloride Ion Penetrability or Surface Resistivity Testing	AASHTO T 277 / ASTM C 1202 or AASHTO TP 95	350 coulombs after 28 days	1 per job (Performed prior to field placement)
Slump Flow and Visual Stability	ASTM C1437 / ASTM C 1611	7 inches (Min.) 10 inches (Max.) No bleed water Consistent fiber distribution	1 per batch

(E) Surface Preparation: An exposed aggregate finish shall be created on all surfaces of the precast concrete element in contact with UHPC to facilitate bond. The exposed aggregate finish shall have a 0.25-inch amplitude. In addition, the concrete contact areas shall be wetted to achieve a saturated surface dry (SSD) condition before UHPC placement. Keep wet and remove all surface water just prior to UHPC placement. Submit the procedures for achieving SSD condition as part of the proposed Placement Plan. The procedures may include: continuously wetted burlap in all joints for 12 hours prior to placement of UHPC; supplemental misting of concrete surfaces after burlap is removed if UHPC placement is delayed; etcetera.

(F) Surface Profile: The finished surface of the UHPC field joints shall be flush with adjacent precast elements to within a tolerance of plus 1/4 inch and minus 0 inches. After curing, grind the UHPC surface smooth with adjacent concrete elements in order to match the profile of the structural elements that are being connected within the acceptable surface tolerance. Grinding of the UHPC surface can be performed when a minimum strength of 10 ksi is achieved. During grinding operations, if steel fiber pullout is observed, grinding shall be suspended and not resumed until approved by the Engineer.

If deemed as necessary by the Engineer, a watertight integrity test shall be performed on 10% of the joints after grinding has been completed. The test shall consist of continuously applying running water at an approximate rate of 300 gallons per hour along the length of the joints to be tested, for a duration of 30 minutes. The underside of the joint shall be inspected for water leakage at 30 minutes and at 1 hour. The joint shall be considered watertight if no dripping water or water droplets are visible underneath precast

concrete element areas along the full length of the joint. If the results of the watertight integrity test are not satisfactory, the Engineer will determine the required corrective action.

Traffic shall not be permitted on the bridge until the UHPC has achieved a minimum compressive strength of 14 ksi or unless otherwise approved by the Engineer.

Method of Measurement:

The quantity of Ultra High Performance Concrete will be measured as the number of cubic feet of UHPC placed and accepted. The volume will be computed using the dimensions shown on the plans. The quantity of grinding will not be measured.

Basis of Payment:

The quantity of UHPC will be paid at the Contract unit price per cubic foot. Price and payment will constitute full compensation for mixing, transporting, placing, finishing, curing, testing and grinding and for furnishing all equipment, tools, labor, and incidentals required to complete the work.

Additional quantity of material used in the determination of material properties and for acceptance testing as described herein will be furnished at no additional cost to the Department. No additional payment will be made for joint surface preparation or for grinding procedures.

If the UHPC does not meet the minimal material properties as described herein, the UHPC shall be removed and replaced or remediated to the satisfaction of the Engineer at the Contractor's expense. If watertight integrity tests are required by the Engineer, such tests will be performed no additional cost to the Department. No additional payment will be made for remedial solutions to insufficient bonding of joints.

4/7/2017

610509 - CONCRETE CULVERT

Description:

This work shall consist of the removal of existing portions of the western headwalls and wing walls of the culverts under SR 141 Northbound and Southbound over Nonesuch Creek as well as the addition of epoxy coated reinforcement, cement concrete waterproofing, as well as furnishing and placing lightweight aggregate fill of the appropriate type at the locations indicated on the Plans and where directed by the Engineer. This work shall be done in accordance with these specifications and in conformity with the line, grade, thickness, and typical sections shown on the Plans or as established by the Engineer in writing.

Materials:

Lightweight Aggregate Fill (65pcf): Section 209 Modified as Specified Herein.

Borrow, Type C: Section 209

Concrete: Section 610, Class B, 3000 psi.

Bar reinforcement, Epoxy Coated: Section 610.

Geotextiles, Separation: Section 708

Topsoil, 4" Depth: Section 908.

Permanent Grass Seeding, Dry Ground: Section 908.

Turf Reinforcement Mat, Type 2: Section 908.

Joint Waterproofing Membrane, 8": 503510 Modified as Specified Herein.

Geogrid

Construction Methods:

Methods of construction shall be in conformance with the applicable sections of the Standard Specifications.

Repair any damage to the portion of the existing structure to remain caused by removal operations to the satisfaction of the Department, at no additional cost to the Department. Have a professional engineer, registered in Delaware, prepare and seal the repair plans and obtain the approval of the Department prior to beginning repairs.

Joint waterproofing membrane shall meet the specification for item 503510, but shall be sized at 24" rather than the item specified 8" and shall be measured by the square yard of material required.

Lightweight aggregate fill shall meet the following requirements:

- (a) The lightweight aggregate shall be rotary kiln-produced expanded shale or expanded clay or expanded slate.
- (b) The lightweight aggregate shall meet the ASTM C330 requirement.
- (c) The lightweight aggregate shall be free draining, abrasion resistant, and durable. The maximum abrasion loss shall be 40% tested in accordance with ASTM C 131. The minimum durability index shall be 35 tested in accordance to AASHTO T 210.
- (d) The lightweight aggregate shall have a maximum in-place moist density of 65 Pounds per Cubic Feet (PCF). The minimum in-place compacted density shall not be less than 40 PCF. The angle of internal

friction of the lightweight aggregate shall not be less than 40 degrees when tested in accordance with ASTM D 3080.

- (e) The lightweight aggregate shall have a resistivity between 30,000 and 40,000 ohm-cm per AASHTO T 288.
- (f) The lightweight aggregate shall have a pH in the range 7 to 9.0 per AASHTO T 289.
- (g) The lightweight aggregate shall have a maximum chloride content of 100 ppm per AASHTO T 291.
- (h) The lightweight aggregate shall conform to the following grading requirements when tested in accordance to ASTM C 136.

Sieve Sizes	Percentage Passing
1" (25 mm)	100
3/4" (19 mm)	90 - 100
3/8" (9.5 mm)	10 - 50
#4 (4.75 mm)	0 - 15
No. 200 (0.075 mm)	0-3

The Contractor shall provide reports documenting the physical properties of the lightweight aggregate fill at least 30 working days prior to the start of the work.

Placing operations for lightweight aggregate fill shall be under the supervision of the Engineer. The lightweight aggregate fill shall be placed in uniform layers and in loose lifts not to exceed 12 inches and compacted to a minimum of 65% relative density in accordance with ASTM D 4253 and D 4254 unless otherwise approved by the Engineer. Rubber tire and steel drum rollers in static mode shall be used in compaction of each lift. In confined areas, vibratory plate compaction equipment shall be used with a minimum of two passes in 6 inches thick loose lifts.

Lightweight aggregate shall be wetted at least 24 hours prior to use, allowing time for the aggregate to become fully saturated and to keep the aggregate particles from segregating during handling. Dry lightweight aggregate shall not be directly batched and mixed.

The lightweight aggregate fill shall be placed on supporting surfaces which have been cleaned of loose debris, sand, dust, or other foreign materials to the satisfaction of the Engineer. Surfaces against which the lightweight aggregate fill is to be placed shall be free of ice, snow or standing water.

Any traffic other than the construction traffic used for placement and compaction shall not be allowed to operate on the exposed lightweight aggregate fill.

The representative of the supplier shall be regularly engaged in the placement of lightweight aggregate fill including the placement of mass fills having a minimum of 12,000 cubic yards in the past 5 years. Lightweight aggregate fill shall have been successfully applied on 5 projects, which have demonstrated satisfactory performance for at least 5 years. The Contractor shall submit a project list to the Engineer, complying with the above requirements a minimum of 30 working days prior to the start of the work.

During the initial placement of the lightweight aggregate fill, the density will be determined at the point of placement by the Contractor, as required, to obtain the specified cast density. Thereafter, the density will be monitored by the Engineer at by performing a minimum of one compaction test per lift and every 2,500 square foot of lift area during placing and the Contractor shall adjust his operations as necessary to maintain the specified moist density.

The Contractor shall determine the in-place moist bulk density (unit weight) of a given aggregate using the procedure as follows:

- The lightweight aggregate producer shall submit documentation of a compacted wet density of less
- (a) than 65 lb/ft³ determined from a one point proctor test conducted in accordance with a modified version of ASTM D 698 “Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.” Due to the cohesionless nature of coarse lightweight aggregate, the standard shall be modified as follows: The aggregate sample shall be placed in a 0.5 cubic foot bucket at the moisture content that the aggregate will be delivered to the jobsite. The sample shall be placed in three equal layers with each layer compacted 25 times using a 5.5 pound rammer by dropping from a distance of 12 inches (AASHTO T-99 modified as above). Material shall be compacted to a minimum of 65% relative density in accordance with ASTM D 4253
 - (b) and D 4254. The maximum index density and unit weight shall be determined using a vibratory table when tested in accordance with ASTM D 4253 and the minimum index density and unit weight is determined when tested in accordance with ASTM D 4254.

Failure to meet the wet density criterion for the type shall require removal and replacement of that entire lift, and all overlying lifts, at the Contractor’s expense based on an engineering evaluation performed by the Engineer.

Method of Measurement:

Concrete Culvert will not be measured.

Basis of Payment:

The quantity of Concrete Culvert will be paid for at the Contract lump sum. The payment will be full compensation for removal of a portion of the existing wingwalls and headwall, placement of reinforcement, cement concrete, and waterproofing, for excavation and lightweight aggregate backfill, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

3/27/2019

612500 - PRECAST CONCRETE PIER CAP

Description.

Furnish and erect precast reinforced concrete pier cap members.

Materials.

- A. Provide Portland Cement Concrete in accordance with Section 1022 with a 28-day compressive strength as specified in the Contract Documents. For precast elements, if no strength is specified in the Contract Documents, provide concrete with a 28-day compressive strength of 5,000 pounds per square inch.
- B. Provide Bar Reinforcement in accordance with Sections 1037.
- C. Provide Closed-Cell Neoprene Sponge conforming to ASTM D1056, Type 2, Class D
- D. Provide Joint Wrap conforming to ASTM C877

Construction.

- A. Design
 - 1. For all other elements, design in accordance with the design Specification noted in the Contract Documents. Utilize AASHTO HL93 loading or Delaware Legal Load, whichever governs.
- B. Working Drawings
 - 1. Submit Working Drawings for review and concurrence, consisting of a complete set of detailed shop drawings for the precast concrete units to be provided. Include the following, as applicable:
 - a. An overall plan showing all units together.
 - b. Details of each type of unit.
 - c. A plan view of reinforcement for any irregularly shaped sections (skewed, curved, etc.)
 - d. Details of placement of all embedded accessories such as threaded inserts, post-tensioning ducts, vents, weep holes, anchorage reinforcement and hardware, dowel holes, anchor bolts, shear connectors, tie rods, lifting strands or eyes, form hangers, stay-in-place form plates, and other related items. Ensure that there will be no conflicts among the planned positions of embedded items and that the concrete cover will be adequate.
 - e. Reinforcing bar list
 - f. Bill of Materials including all accessories
 - 2. If the Contractor proposes an alternate design such as alternate structural dimensions or reinforcement, submit supporting calculations that meet the design criteria in Section 612.03.A. Submit load ratings for HL-93, HS-20, and Delaware legal loads using BRASS program in accordance with the latest version of the AASHTO Manual for Bridge Evaluation. The calculations will be certified by a registered Professional Engineer in the State of Delaware.

C. General Manufacturing Requirements

1. For precast elements, plants that are National Precast Concrete Association (NPCA)-certified and plants that have been inspected and approved by the Department, will be permitted to manufacture the units.
2. All Materials, Equipment, processes of manufacture, and the finished units, as well as handling, storage, transportation, and erection, will be subject to inspection and approval. Any defective construction, which may adversely affect the strength of a member or its performance in the bridge Structure, will be cause for rejection.
3. Follow the manufacturer's recommended procedures for handling and placing the precast units during the entire process of transporting, unloading, and installing the members. Handle precast units only by lifting devices provided especially for this purpose.

D. Precast Concrete Elements

1. Precast Element Fabrication

- a. Provide lifting devices as necessary. Placement of lifting devices must not come in conflict with prestressed strands. Show placement of lifting devices, material information, and details in Working Drawings.
 - i. Provide a maximum of four devices or holes in each unit for the purpose of handling.
- b. Determine the section lengths and location of joints. Do not exceed a length that causes any bending, distortion, or stress being induced therein during lifting, moving, and placing of the section.
- c. Joints
 - i. Provide neoprene gaskets at joints between all precast units in order to make the joints watertight.
- d. Prepare for forming and pouring of the concrete in accordance with Section 610.
- e. Provide reinforcement that meets or exceeds minimum area of steel per foot denoted in the Contract Documents.
 - i. Place bar reinforcement in accordance with Section 611. Place reinforcement beginning at 2 inches from the end of each unit.
- f. Provide a smooth finish all around.
- g. Cure precast concrete members that are manufactured in established plants with steam or radiant heat. Cure precast elements in accordance with ACI, PCI, or approved plant Quality Control Plans.
- h. Apply a water-miscible, penetrating, silane sealer to the top of each unit plus 2 feet - 0 inches down each side, and to all headwalls, end faces and exposed faces.
- i. Tolerances
 - i. Internal Dimensions - The internal dimension will meet PCI MNL 135-0; 10.25.

- ii. Slab and Wall Thickness - Any slab or wall thickness will not be more or less than the design dimensions by more than 5 percent.
- iii. Length of Opposite Surfaces - Variations in laying lengths of two opposite surfaces of any unit sections will not be more than 1/8 inch per foot of internal span, with a maximum of 5/8 inch for all sizes through 7 feet internal span, and a maximum of 3/4 inch for internal spans greater than 7 feet.
- iv. Length of Section - The variation in length will not be more than 1/8 inch per foot of length with a maximum of 1/2 inch in any unit.
- v. Position of Reinforcement - The maximum variation in the position of the reinforcement will be $\pm 3/8$ inch, except the cover over the reinforcement for the external surface of the top slab shall not be less than 2 inches for earth covers less than 3 feet.
- vi. Area of Reinforcement - Steel areas greater than those required will not be cause for rejection. The permissible variation in diameter of any reinforcement shall conform to the tolerances prescribed in the ASTM specification for that type of reinforcement.

2. Precast Element Installation

- a. Construct foundation consisting of a layer of the type of coarse aggregate as specified in the Contract Documents. Carefully place and tamp coarse aggregate to form a solid, unyielding mass with the exposed surface conforming to the form and dimensions shown in the Contract Documents. The bedding areas on which the coarse aggregate will be placed shall be approved by the Engineer prior to installation of the precast elements.
- b. Exercise care to insure proper matching and aligning of joints of adjacent units. Assemble precast units in accordance with the recommendations of the manufacturer and as approved by the Engineer in the field. Place the precast sections so that when they are laid together, they will make a continuous line of units with a smooth interior free of appreciable irregularities. If necessary, shim units to maintain a difference of 1/2 inch or less between the soffits of adjacent units.
- c. Cover the joint exterior with a minimum of a 9 inches wide wrap centered on the joint. Exercise care to keep the joint wrap in its proper location during backfilling.
- d. Before backfilling, fill all post-tensioning pockets and ducts, lifting eyes, footing keyways, and any other holes or pockets with non-shrink grout. Cover all locations on the fill face with a minimum length and width of 9 inches of joint wrap Material.

Method of Measurement.

- A. The quantity of Precast Concrete Pier Cap will be measured as the number of cubic yards of concrete placed and accepted.
- B. The quantity of prestressed reinforced concrete members placed and accepted will not be measured.

Basis of Payment.

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

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
612500	PRECAST CONCRETE PIER CAP	CY
B.	Price and payment will constitute full compensation for furnishing all Materials, including reinforcing bar, related to the precast units; designing, fabricating and installing the units on site; and for all labor, tools, Equipment and incidentals required to complete the Work. Accessories and associated elements will be incidental to the respective Item. Excavation, backfill, backfilling, and coarse aggregate will be paid separately under their respective Bid Items.	
C.	The removal and replacement of all precast members rejected due to defective construction or improper storing, handling, transporting, or installation will not be paid.	

4/2/2018

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

Description:

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

Materials and Construction Methods:

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

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

The excavation and backfill for the pipe shall be performed in accordance with the applicable requirements of Section 612 of the Standard Specifications, unless otherwise modified on the Plans. The pipe shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Engineer.

Method of Measurement:

The quantity of PVC pipe will be measured as the actual number of linear feet (linear meters) of each size of pipe placed and accepted, measured from end to end of pipe, including structure wall thickness, but excluding structure interior.

Basis of Payment:

The quantity of PVC pipe will be paid for at the Contract unit price per linear foot (linear meter) for each size of pipe. Price and payment will constitute full compensation for furnishing, hauling, and installing pipe, for all cribbing or foundation treatment necessary to prevent settlement, for all shoring and sheeting, for the replacement of any pipe which is not true in alignment or which shows any settlement after laying, and for all material, labor, equipment, tools, and incidentals required to complete the work.

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

10/31/01

615501 – PREFABRICATED SUPERSTRUCTURE MODULES

Description

Furnish, fabricate, handle, transport, erect, and grind prefabricated superstructure modules. Each prefabricated superstructure module consists of two steel girders constructed with a cast-in-place deck made composite with both girders, assembled prior to erection. Prefabricated modules are then erected adjacent to each other to form a complete superstructure.

Materials Provide Materials as specified in:

Concrete Structures	Section 610
Steel Structures	Section 615
Elastomeric Bearing Pads	Section 623

Construction

A. Working Drawings.

Submit Working Drawings for review and concurrence. Working Drawings must be signed and sealed by a registered Professional Engineer in the State of Delaware. Submit Working Drawings a minimum of 30 days prior to the commencement of module fabrication. Do not order Materials or begin work until approval of the Working Drawings by the Engineer. Include the following in the Working Drawings at a minimum:

1. Module Fabrication Plan.

The Module Fabrication Plan pertains to construction operations during framing of the steel girders and construction of the concrete deck. Include the following:

- i. Name of the firm(s) and associated personnel that will be supervising and/or performing module fabrication.
- ii. Location and description of fabrication site. Include confirmation of an agreement between Contractor and property owner to allow use of property.
- iii. Details of all Equipment that will be employed for the construction of the modules.
- iv. Details of temporary supports and bracing used during framing and deck placement.
- v. Methods and details of temporary support system used to fabricate modules. Contractor is responsible for the design and stability of the temporary support system during all construction operations. Include details and calculations for temporary support system used to construct modules and how elevations of temporary support will be controlled to match proposed substructure conditions.
- vi. Proposed Critical Path Method (CPM) schedule for module fabrication including: detailed sequence of construction for all module framing and deck placement operations and minimum waiting periods for curing and form stripping.
- vii. Quality control plan pertinent to module fabrication.

2. Assembly Plan.

The Assembly Plan pertains to construction operations related to lifting, handling, transporting, placing, supporting, and securing the prefabricated superstructure modules. Include the following:

- i. A work area plan depicting temporary and permanent structures, haul roads, site access, Material staging areas, utilities, and other temporary or permanent site features relevant to module assembly. The work area will be restored according to agreeable terms between the awarded Contractor and the owner of the property where work occurs.
- ii. Means and methods for lifting, handling, storing, transporting, and erecting modules.

- iii. Details of lifting devices and attachment points, with computations to demonstrate that all lifting devices have adequate capacity to resist lifting stresses. Provide details of any auxiliary concrete reinforcing required for lifting operations to prevent damage to the concrete deck due to lifting stresses.
 - iv. Details of all Equipment to be used to lift modules including: cranes, rigging, blocks, swivels, lifting slings, sling hooks, jacks, etc. Include locations of cranes and pick radii used to erect modules at the bridge site.
 - v. Construction load analyses including computations to indicate the magnitude of stress in the modules during lifting operations. The Contractor is responsible for demonstrating that all module components to be lifted have adequate capacity to resist lifting stresses, and therefore cracking and damage due to lifting, and the erection equipment has adequate capacity for the work to be performed.
 - vi. Minimum concrete compressive strength achieved prior to handling of the modules.
 - vii. Proposed CPM schedule for all assembly operations including: lifting, handling, pre-assembly, transporting, and erecting modules. Account for setting and cure time of substructure and superstructure components.
 - viii. Traffic management plan if impacts to traffic occur during transporting or erecting modules. Adhere to Contract Documents for lane closure restrictions and traffic impact limitations.
 - ix. Available route to transport modules from the casting site to the bridge site for erection. If load permits are required to cross existing bridges along the transportation route, it is the responsibility of the Contractor to obtain the necessary load permits.
 - x. Methods and details of temporary support of the modules during lifting, handling and final placement of the modules, if needed. Include methods of adjusting, bracing, and securing the modules after placement on the proposed substructure.
 - xi. Methods and procedures for removing and patching lifting devices, attachment points, leveling devices and other inserts/blockouts, as applicable.
 - xii. Procedures for controlling horizontal and vertical tolerance limits. Include details of any alignment brackets, jigs, templates, shims, etc.
 - xiii. Methods for leveling any differential camber between adjacent modules prior to placing closure pour.
 - xiv. Methods of reducing vibration during curing of the closure pour between adjacent modules from phase 1 and phase 2 construction activities.
 - xv. Methods and details of grinding the top deck surface after module erection and closure pours are complete.
3. Fabrication Drawings.

Fabrication Drawings pertain to documentation of Material data, Material testing, quantities, and other pertinent information related to the fabrication of superstructure modules. Include the following at a minimum:

- i. Structural steel in accordance with Section 615.03.B.1 including shear connectors and bearing assemblies.
- ii. Elastomeric bearing pads in accordance with Section 623.03.A.
- iii. Concrete Quality Control Plan in accordance with Section 610.03.A.3.
- iv. Reinforcing bar list.
- v. Bill of Materials including all accessories.

B. Quality Assurance.

1. Prefabricated superstructure modules will be inspected by the Engineer or a representative of the Engineer, for condition and quality assurance. Inspections will occur as desired by the Engineer, but at a minimum will include: during fabrication, storage, handling, and erection.
 - a. As requested, allow site access of the Engineer or a representative of the Engineer to inspect the modules if the module units are fabricated off site.
2. Mark each module with a unique identification system, date of fabrication, and if applicable supplier identification. Markings will be readily visible for purposes of inspection and erection.
3. Repair defects and/or damage to precast concrete deck of the module in accordance with the following:
 - a. Notify the Engineer of suspected defects and/or damage. Modules that exhibit defects and/or damage may be subject to review or rejection by the Engineer.
 - b. Submit repair procedures to the Engineer for review and approval. Do not proceed with repair without written approval from the Engineer.
 - c. Concrete repair work must reestablish the module's structural integrity, durability, and aesthetics to the satisfaction of the Engineer.
 - d. Determine cause of defects/damage and establish corrective action plan to prevent similar repetitive defects/damage.
 - e. Additional compensation or a time extension will not be approved for the repair or removal and replacement of defected/damaged modules when the Engineer determines the cause to be the responsibility of the Contractor.
4. Modules may be rejected for any of the following reasons:
 - a. Fabrication not in conformance with the Contract Documents.
 - b. Dimensions not within the allowable tolerances specified in the Contract Documents.
 - c. Camber that does not meet the requirements specified in the Contract Documents.
 - d. Defects indicating concrete proportioning, placement, and/or consolidation not in conformance with the Contract Documents.
 - e. Damaged, cracked, or spalled ends or edges preventing satisfactory construction, and/or performance of deck joints.
 - i. Module rejection due to damaged, cracked, or spalled ends or edges may occur at any time including during fabrications, storage, transport, assembly, or erection.
5. Tolerances.
 - a. Permissible tolerances for steel girders in accordance with Section 615.03.C.
 - b. Finished concrete deck module surface, after grinding, must not contain variations that exceed 1/4 inch from a 10 foot straightedge in the longitudinal and transverse directions.
 - c. Differential camber between adjacent modules must not exceed 1/2 inch before transport to the bridge site. Control of camber during fabrication is required to achieve ride quality. Establish the differential camber by pre-assembling the modules as required herein.
6. Document test results for module concrete with the following information:
 - a. Module identification corresponding to the location of tested concrete material.
 - b. Date and time of concrete placement.

- c. Concrete cylinder test results.
 - d. Quantity of placed concrete.
 - e. Date of form-stripping.
 - f. Temperature and moisture conditions during curing period.
 - g. Repairs, if applicable.
- C. Fabrication.
- 1. Furnish and fabricate steel girders in accordance with Section 615.
 - 2. Furnish, construct, and cure concrete deck on top of steel girders in accordance with Section 610.
 - a. The use of stay-in-place deck forms will not be permitted.
 - b. Fabricate longitudinal connection joints of each module units in accordance with Ultra High Performance Concrete (UHPC) special provision.
 - 3. Fabricate superstructure modules at a temporary location that does not interfere with concurrent construction activities related to the roadways or bridges of the associated Contract. The awarded Contractor may elect to construct the concrete deck or have a National Precast Concrete Association (NPCA) or Precast/Prestressed Concrete Institute (PCI) certified pre-cast concrete fabrication facility complete the required concrete work. Fabrication of superstructure modules will not interfere with proposed traffic phasing or lane restrictions as specified in the Contract Documents. It is the responsibility of the Contractor to secure a casting site that provides adequate space for material delivery, module fabrication, pre-assembly, and shipping of the completed units.
 - 4. For the purpose of developing the design dead load deflection, support prefabricated superstructure modules only at the permanent bearing points during the deck casting operation. For module fabrication arrange steel girders to match proposed girder spacing and relative difference between bearing elevations of the final bearing configuration.
 - a. Temporary bracing for lateral stability is acceptable during girder set-up, before the cross-frames/diaphragms are installed. Remove temporary bracing prior to the placement of the concrete deck. During the deck pour, no bracing systems will be in place for lateral stability (with the exception of the cross frames/diaphragms) unless approved by the Engineer.
 - b. Shored construction to vertically support the girders along their length will not be permitted.
 - 5. Achieve a minimum concrete compressive strength of 30% of the required 28-day design strength as specified in the Contract Documents, before removing formwork used for concrete deck construction.
 - 6. Pre-assemble (dry-fit) adjacent prefabricated superstructure modules to ensure alignment and tolerance limits are met between modules to the satisfaction of the Engineer, before transport to the job site. The approved procedure in the Assembly Plan for leveling any differential camber will re-evaluated during pre-assembly and verified by the Engineer. Relative bearing seat elevations shall be re-established after successful module pre-assembly and shall be compared to the substructure bearing seat elevations in place. Vertically adjust bearing seat elevations, if required, according to the methods approved in the Assembly Plan. Do not pour transverse or longitudinal connection joints during pre-assembly.
 - a. Evaluate modules for proper fit, placement, and functionality of anchor bolts. Relative anchor bolt locations shall be verified and reviewed against the substructure elements to ensure compatibility with the substructure.
- D. Handling and Storing.
- 1. Lifting and handling devices are the responsibility of the Contractor and shall be in accordance with Chapter 5 of the PCI Design Handbook.

2. Modules damaged during handling and/or storage shall be repaired or replaced as described herein and as directed by the Engineer.
 3. Lift modules, at the approved designated points and by approved lifting devices properly attached to the module, utilizing proper hoisting procedures. The Contractor is responsible for design of the lifting devices and all necessary precast concrete modifications to accommodate handling stresses in the modules.
 - a. The angle between the top surface of the deck and the lifting line shall not be less than 60 degrees, when measured from the top surface of the deck to the lifting line. If two cranes are used the lifting lines should be vertical.
 4. Do not place additional loading on the module units that will cause unanticipated deflection or creep-induced deformation.
 5. Do not subject modules to damaging torsional, dynamic, or impact stresses at any point during handling or storage.
 6. Lift and store modules in the upright orientation with steel beams on the bottom side for support, as shown by the final placement of the modules in the Contract Documents.
 7. Support prefabricated superstructure modules at the permanent bearing points during storage, with no additional supports provided along the span of the module. Provide adequate support during storage to prevent damage due to differential settlement.
 8. Achieve the minimum concrete compressive strength approved in the Assembly Plan prior to moving prefabricated modules.
 9. Superstructure modules will be inspected by the Engineer or a representative of the Engineer, for condition and quality assurance during and after handling of the units. If modules are stored for long periods of time they should be inspected once per month by the Engineer and Contractor to ensure continued integrity of the units.
- E. Transportation.
1. Provide 48-hours of notice to the Engineer prior to transporting modules to the bridge site.
 2. Do not transport modules from the casting site until the concrete deck has reached a minimum age of 14 days and the concrete deck attains the minimum compressive design strength specified in the Contract Documents.
 3. Transport modules in the upright orientation with steel beams on the bottom side for support, as shown by the final placement of the modules in the Contract Documents. Primary vertical support for the modules shall be provided at the permanent bearing locations, with auxiliary support, bracing, and/or blocking provided as required and as noted in the approved Assembly Plan.
 - a. Modules may be loaded on a trailer that is capable of supporting the modules during transport without inducing damaging axial, torsional, or dynamic stresses to the module.
 - b. Devices used to secure the modules in place during transportation must extend around the top of the module (over the concrete deck) and not solely attach to the bottom flanges of the beam.
 - c. Provide shock-absorbing cushioning material at all bearing locations during transportation. Tie-down straps or other means of securing shall be positioned only at designated locations of sufficient bracing and/or blocking.
 4. Superstructure modules will be inspected by the Engineer or a representative of the Engineer, for condition and quality assurance after transport of the module to the project site. Material, quality, and condition of the modules will be inspected after transport to the project site.

F. Module Erection.

1. Do not erect modules into their final position until the concrete deck has reached a minimum age of 14 days and attains the minimum compressive design strength specified in the Contract Documents.
2. Do not place modules on substructure components until the substructure components have achieved minimum design strength and, if required, sufficient bracing has been provided at the substructure components to facilitate the Contractor's intended module placement procedures.
3. Survey the top elevation of the substructures units. Check for proper alignment and that elevations are within specified tolerances. Establish working points, working lines, and benchmark elevations prior to the placement of superstructure modules.
4. Clean bearing surfaces of the substructure and girders before modules are erected. Ensure substructure bearing area is level and true within acceptable construction tolerances, allowing for proper performance of vertical adjustment methods and elastomeric bearing pads in accordance with the manufacturer's recommendations. Localized smoothing of the substructure bearing area may be performed by grinding or other methods necessary as approved by the Engineer.
5. Place bearing devices in accordance with Section 623.
6. Erect modules using lifting devices and/or attachment points as approved by the Working Drawings and as per Section D – Handling and Storing, of this Specification.
7. Set modules in the designated permanent bearing locations of the erected substructure. Do not allow modules to bear at any location on the substructure not designated on the plans as a bearing location.
8. Depending on the magnitude, differential camber may be leveled by applying dead load to the nearest beam on the higher module to bring it within the connection tolerance, utilizing a leveling beam to equalize camber, or allowing a blanket grind of the deck to accommodate differences. The leveling procedure shall be demonstrated during the pre-assembly process prior to shipping to the site. The Assembly Plan shall indicate the leveling process to be applied in the field.
9. Temporarily support, anchor, and brace all erected modules as necessary for stability and to resist gravity loads, wind loads or other loads until they are permanently secured to the substructure, as required and as detailed in the approved Assembly Plan.
10. Complete installation of bearing devices, anchor bolts, etc. in accordance with Section 623.
11. Patch holes occupied by lifting devices and/or inserts according to approved Working Drawings.
12. Module units will be inspected by the Engineer or a representative of the Engineer, for condition and quality assurance prior to and after erection of the units.

G. Closure Pour.

1. Level differential camber according to the approved Assembly Plan prior to pouring transverse and longitudinal closure pour. Methods to level differential camber will remain in place until both adjacent joints (with the exception of the module between construction phases) is filled entirely and the UHPC reaches a minimum compressive strength of 15 ksi.
2. Do not apply traffic or other loading until the UHPC connection achieves a minimum compressive strength of 15 ksi, unless otherwise approved by the Engineer.
3. Follow special provision provided in Contract Documents for furnishing and placing UHPC used in the deck closure pour connections.
4. Limit live load vibration from traffic when placing and curing longitudinal closure pour joint between modules of construction Phase I (Construction Phase 5) and Phase II (Construction Phase 6), until the UHPC reaches a minimum compressive strength of 15 ksi. An acceptable method of limiting vibration would be increasing the distance between live traffic and the location of the joint. Follow Contract Documents for traffic restrictions and lane closure limitations if traffic is shifted or a lane is closed.

H. Grinding.

1. Blanket grind top surface of prefabricated superstructure modules and UHPC joint to create a smooth surface. Do not grind deck surface until UHPC connection pour of transverse and longitudinal joints have reached a minimum compressive strength of 10 ksi. During grinding operations, if steel fiber pullout is observed in the UHPC, grinding shall be suspended and not resumed until approved by the Engineer.
2. The extent of the required grinding will be described in the Contract Documents and as directed by the Engineer.

Method of Measurement

- A. The quantity of prefabricated superstructure modules placed and accepted will not be measured.

Basis of Payment

1. Payment will be made at the lump sum Unit Bid Price for all modules per Bridge.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
615501	PREFABRICATED SUPERSTRUCTURE MODULES	LS

2. Price and payment will constitute full compensation for furnishing all Materials related to the prefabricated superstructure units including: girders, stiffeners, connections plates, diaphragms, cross frames, shear studs, sole plates, bolts, nuts, washers, anchor bolts, elastomeric bearing pads, reinforcing bar, concrete, lifting devices, vertical adjustment shims, camber adjustment devices; fabricating, handling, pre-assembling, storing, transporting, erecting, and grinding; and for all labor, Equipment and incidentals required to complete the Work.

3. The repair or removal and replacement of prefabricated superstructure modules due to defective construction, improper fabrication, storing, handling, transporting, or erecting will not be paid.

4. The Department will not make separate payment for temporary structures used to fabricate superstructure modules, for acquiring, maintaining, and restoring a temporary fabrication site, or to install, maintain, and remove haul roads that are needed for site access to fabricate and transport superstructure modules.

5. Price and Payment for furnishing, placing, and curing UHPC for transverse and longitudinal deck closure pours will be paid and specified by Item 610500 – Ultra High Performance Concrete.

6. Price and Payment for preparing the deck surface, furnishing, placing, curing, and texturing the proposed bridge deck overlay will be paid and specified by Item 625501 – Polyester Polymer Concrete Overlay Installation and Item 625502 - Furnishing Polyester Polymer Concrete Overlay.

3/27/2019

615504 - BRIDGE ELECTRICAL SYSTEM2746538 - BRIDGE ELECTRICAL SYSTEM

Description:

This work under this Section consists of furnishing and installing PVC conduit, fittings, junction boxes, and expansion joints on the bridges as shown on the Plans, as specified herein, and/or as directed by the Engineer. Any incidental apparatus, appliance, material, or labor not specifically mentioned or included in the Contract Documents that may be found necessary to comply with the requirements of the related documents and referenced standards or codes shall be furnished by the Contractor at no additional cost to the Delaware Department of Transportation (DelDOT).

Bridge 676

Materials:

Lighting - PVC Conduit - 3" schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

Junction Boxes - shall meet ANSI Specifications, U.L. requirements and listed as raintight (NEMA 4X rated), and shall accommodate the size and number of conduits shown on the Plans. Junction boxes/wells shall be galvanized steel alloy and constructed to the size indicated.

Shop drawings and/or catalog cuts for the above listed materials shall be submitted to the Engineer for approval.

Construction Methods:

Prior to placing the Parapet Wall concrete, the Contractor shall install 2 EA 3" PVC conduit for the lighting system in the parapet wall for the entire length of the structure. The conduit for lighting shall also sweep out of the parapet, under the approach slab, and exit to junction wells located outside the Bridge at both ends of the structure. The junction boxes to access the lighting conduits shall be spaced as shown in the plans, and at intervals not to exceed 300 feet. All conduits shall include a pull wire for future cable installation. Junction boxes in the bridge shall be positioned to avoid any fence posts and/or Guardrail to Bridge attachments and shall be flush with the front face of the parapet wall. Conduits exiting the structure shall be positioned to avoid all guardrail posts. Prior to placing approach slab and/or sleeper slab concrete, all conduits exiting the bridge must be installed beneath the concrete including any necessary sweeps to properly enter the junction well outside of the structure.

Bridge 677

Materials:

ITMS - PVC Conduit - 2" schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

ITMS - PVC Conduit - 4" schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

Junction Boxes - shall meet ANSI Specifications, U.L. requirements and listed as raintight (NEMA 4X rated), and shall accommodate the size and number of conduits shown on the Plans. Junction boxes/wells shall be galvanized steel alloy and constructed to the size indicated.

Shop drawings and/or catalog cuts for the above listed materials shall be submitted to the Engineer for approval.

Construction Methods:

Prior to placing the Parapet Wall concrete, the Contractor shall install 1 EA 2" PVC conduit and 1 EA 4" PVC conduit for the ITMS system in the parapet wall for the entire length of the structure. The conduit for ITMS shall also sweep out of the parapet, under the approach slab, and exit to junction wells located outside the Bridge at both ends of the structure. The junction boxes to access the ITMS conduits shall be spaced as shown in the plans. All conduits shall include a pull wire for future cable installation. Junction boxes in the bridge shall be positioned to avoid any fence posts and/or Guardrail to Bridge attachments and shall be flush with the front face of the parapet wall. Conduits exiting the structure shall be positioned to avoid all guardrail posts.

Prior to placing approach slab and/or sleeper slab concrete, all conduits exiting the bridge must be installed beneath the concrete including any necessary sweeps to properly enter the junction well outside of the structure.

Method of Measurement:

The quantity of bridge electrical system will not be measured, but will be paid by Lump Sum.

Basis of Payment:

The quantity of bridge electrical system will be paid for at the contract bid price for lump sum for Item 615504, BRIDGE ELECTRICAL SYSTEM. Price and payment will constitute full compensation including all labor, tools, equipment, material and incidentals necessary to satisfactorily complete the work in accordance with the Contract Plans and Special Provisions, including but not limited to: furnishing and installing the required conduits within the parapet walls, extending the conduit to the junction wells located outside the structure, including all fittings, conduit sweeps, junction boxes in the parapet wall, expansion joints, and pull wires within all conduits.

The lump sum bid for Item 615504 shall be the sum of the cost associated with the work performed at each bridge listed. The breakout sheet provided in the Bid Proposal shall be completed and attached to the Contractor's bid. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

All wiring inside the conduits will be paid separately. Junction wells located outside the structure will be paid for separately under their respective bid item.

3/27/19

615515 - RIDE SHELTER INSTALLATION

Description:

This work consists of constructing a portland cement concrete pad and installing a ride shelter provided by the Delaware Transit Corporation (DTC) in accordance with notes and details on the Plans, these specifications, and as directed by the Engineer.

Materials:

Portland Cement Concrete. Portland cement concrete shall be Class A conforming to the requirements of the Section 1022 of the Standard Specifications.

Base Course. The base course shall conform to the requirements of Section 301 of the Standard Specifications.

Reinforcement. Welded wire fabric shall conform to the requirements of AASHTO M 55/M 55M and Section 1037 of the standard specifications.

Shelter. The shelter will be furnished by DTC. The Contractor shall make arrangements to pick up the shelter from DTC's facility and deliver it to the site.

Construction Methods:

The site shall be excavated and graded in accordance with lines, grades and details shown on the Plans. The subgrade shall be prepared in accordance with Section 202 of the Standard Specifications.

The base course and concrete pad shall be placed in accordance with Section 301 and Section 705 of the Standard Specifications and per DelDOT Standard Detail M-9 (2013). The surface of the concrete pad shall have a stiff-broom finish.

The shelter shall be anchored to the pad as per instructions from the DTC.

Method of Measurement:

The quantity of ride shelters installed will be measured as the actual number of each installed and accepted.

Basis of Payment:

The quantity of ride shelters installed will be paid for at the Contract unit price for each ride shelter. Price and payment will constitute full compensation for furnishing (except shelter as noted), hauling, and placing all materials including hardware to anchor the pad, for excavating and preparing the foundation, and for all labor, equipment, tools and incidentals required to complete the work.

3/27/19

617515 - HEADWALL

Description:

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

Materials:

Materials shall conform to the requirements of Section 601, 1022 and 1037 of the Standard Specifications.

Construction Methods:

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

Method of Measurement and Basis of Payment:

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

4/27/2018

625501 - POLYESTER POLYMER CONCRETE OVERLAY INSTALLATION
625502 - FURNISHING POLYESTER POLYMER CONCRETE OVERLAY

625.01 Description.

Furnish materials and construct concrete overlay on concrete deck surfaces where shown in the Contract Documents or as directed by the Engineer.

625.02 Materials.

- A. Furnish a high molecular weight methacrylate primer in accordance with Section 1045.04.
- B. Furnish aggregate and finishing sand in accordance with Section 1003 and the following:
 - 1. Use the following gradation requirements:

Combined Aggregate		
Sieve Size	3/8" Max. Percent Passing	#4 Sieve Max. Percent Passing
1/2"	100	100
3/8"	83-100	100
#4	65-82	62-85
#8	45-64	45-67
#16	27-48	29-50
#30	12-30	16-36
#50	6-17	5-20
#100	0-7	0-7
#200	0-3	0-3

- 2. Aggregate retained on the #8 sieve must have a maximum of 45 percent crushed particles when tested in accordance with AASHTO Test Method T27.
- 3. Fine aggregate must consist of natural sand only.
- 4. Aggregate absorption must not exceed one percent as determined by AASHTO Test Methods T84 and T85.
- 5. At the time of mixing with the resin, the moisture content of the aggregate, as determined by AASHTO Test Method T 255, must not exceed one half of the aggregate absorption.
- 6. Finish sand must be a dry No. 8/20 commercial quality blast sand.
- C. Furnish a polyester binder consisting of polyester resin binder and dry aggregate.
 - 1. The resin must be an unsaturated isophthalic polyester-styrene co-polymer conforming to the following:

Polyester Resin Binder		
Property	Requirement**	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 D 2196
Elongation	35 percent minimum Type I at 0.45"/min. Thickness = 1/4" ± 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 = 1/4" ± 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		
**Values are based on specimens or samples cured or aged at 77 F unless otherwise indicated.		

2. The silane coupler must be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter shall be compatible with methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators.
- D. Submit samples of materials for all components of the overlay system 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.
 - E. Furnish a Material Safety Data Sheet 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.
 - F. **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 1045.04©.
2. Receipt of a manufacturer's certification stating the primer, aggregate and polyester binder meet the material requirements found above.
3. Approval by the Materials and Research Section based on conformance with the material requirements above.

625.03 Construction.

1. General.
 - a. At least ten (10) days before start of work, provide the Engineer with two (2) copies of the manufacturer's written instructions for the installation of the overlay system.
 - b. Ensure that the manufacturer's technical representative is available for up to three (3) working days to make recommendations to facilitate the overlay installation, including surface preparation, overlay application, and overlay cure.
 - c. During surface preparation and overlay application, take precautions to assure that traffic is protected from rebound, dust, and construction activities. Provide appropriate shielding as required and directed by the Engineer.
 - d. During overlay application, provide suitable coverings (e.g. heavy duty drop cloths) to protect all exposed areas not to be overlaid, such as curbs, sidewalks, parapets, etc. Clean and/or repair all damage or defacement resulting from this application to the Engineer's satisfaction at no additional cost.
2. Storage of Materials.
 - a. Store all materials 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.
3. Equipment.
 - a. Surface Preparation.
 - i. Use only equipment for surface preparation that is specified by the overlay manufacturer and approved by the Engineer. Unless otherwise specified, use automatic shot blasting units to clean pavement surfaces. The automatic shot blasting units are to be self propelled and include a vacuum to recover spent abrasives, and the abrasives are to be steel shot. In those areas not accessible to this machinery, the surface may, with the Engineer's approval, be cleaned with blast cleaning equipment. Use magnetic rollers to remove any spent shot remaining on the deck after vacuuming.
 - b. Application.
 - i. Mix polyester concrete in mechanically operated mixers no larger than 9 cubic feet in 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 must 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. Record the volumes at no greater than five (5) minute intervals along with the time and date of each recording. Furnish a printout of the recordings to the Engineer at the end of each work shift.

c. Finishing and Texturing.

- i. Use an approved finishing machine complying with Section 610.03(E)(4)(c)(i) and having a vibrating pan to properly consolidate the mix.

4. Surface Preparation.

a. Prepare all structural slab surfaces that will be in contact with the overlay as follows:

- i. 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. Perform the testing in accordance with ACI 503R-93, Appendix A. The Engineer will designate the location of the test patches.
- ii. Before application of the primer, clean the entire deck area 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 that 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. Remove areas of asphalt larger than 1 inch in diameter or smaller areas spaced 6 inches apart. Traffic paint lines will be considered clean when the concrete has exposed aggregate showing through the paint stripe. Use a vacuum cleaner to remove all dust and other loose material.
- iii. 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.
- iv. Do not place the overlay until all patching and cleaning operations have been inspected and approved. Remove any contamination of the deck after initial cleaning. The entire overlay system may only be applied following the cleaning and prior to opening the area to traffic.
- v. Do not expose cleaned pavement surfaces to vehicular or pedestrian traffic other than that required by the overlay operation. If the pavement is contaminated before being overlaid, re-clean the contaminated area by abrasive blasting to the satisfaction of the Engineer. No additional payment will be made for re-cleaning work.
- vi. Ensure that the concrete is dry at the time of application of the overlay.
- vii. Clean all steel surfaces that will be in contact with the overlay in accordance with SSPC-SP No. 10, Near-White Blast Cleaning, except that wet blasting methods shall not be allowed.

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

5. Application.

a. Prime Coat

- i. Prior to applying the prime coat, ensure the area is dry and blow the area clean with oil-free compressed air. The surface temperature must be at least 50°F.
- ii. Uniformly apply the prime coat to completely cover the surface to receive the polyester concrete. Use a rate of spread of approximately 2.3 ounces per square foot of deck surface or as recommended by the manufacturer. Allow the prime coat to cure a minimum of 15 minutes before placing polyester concrete.
- iii. When magnesium phosphate concrete is placed prior to the deck overlay, place the magnesium phosphate concrete at least 72 hours prior to placing the prime coat.
- iv. When modified high alumina based concrete is placed prior to the deck overlay, do not place the prime coat on said concrete until at least 30 minutes after final set.

b. Polyester Concrete

i. Test Patches

- 1.) Prior to constructing the overlay, place one or more trial overlays 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 must be 12' wide, at least 6' long, and the same thickness as the overlay to be constructed, and the conditions during the construction of the overlay and equipment used should be similar to those expected and to be used for the construction of the polyester 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.
- 2.) The test patch must 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.
- 3.) If required, remove and dispose of all material used in the trial overlay, including the concrete test patch.
- ii. Place the polyester concrete at least 30 minutes but not more than 120 minutes after the prime coat has been applied.
- iii. Ensure that the polyester concrete contains 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.

- iv. Place the polyester overlay at a minimum thickness of $\frac{3}{4}$ ".
- v. Termination edges of the overlay may require application and finishing by hand trowel due to obstructions such as a curb. Follow all hand troweling by broadcasting aggregate or surface texturing while the resin is still wet to provide acceptable surface friction characteristics.
- vi. Adequately isolate expansion joints prior to overlaying or they 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.
- vii. The amount of initiator used in polyester concrete must be sufficient to produce an initial set time between 30 and 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 C266. Use accelerators or inhibitors as recommended by the resin supplier to achieve proper set times.
- viii. Initiate and thoroughly blend the resin binder just prior to mixing with aggregate. Mix the polyester concrete a minimum of 2 minutes prior to placing.
- ix. Place polyester concrete prior to gelling and within 15 minutes following addition of initiator, whichever occurs first. Discard polyester concrete that is not placed within this time.
- x. The surface temperature of the area to receive polyester concrete must be the same as specified above for the prime coat, a minimum of 50°F.
- xi. Use the finishing and texturing equipment to strike off the polyester concrete to the established grade and cross section. Finishing and texturing equipment must be fitted with vibrators and tines or other means of consolidating and texturing the polyester concrete to the required compaction.
- xii. Apply the finish sand by either mechanical means or hand broadcasting immediately after strike-off, before gelling occurs, and at a minimum rate of 2.75 ounces per square foot.

6. Surface and Thickness Requirements.

- a. The overlay surface will 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.
- b. The surface must not vary more than $\frac{1}{4}$ " from the lower edge of a 12' \pm 0.2' long straight edge placed in any direction. Remove any surfaces which fail to conform to the above tolerance by grinding with an approved grinding tool.
- c. To ensure adequate pavement friction, the completed overlay surface must be free of any smooth or "glassy" areas such as those resulting from insufficient quantities of surface aggregate. Repair any such surface defects in the manner recommended by the manufacturer and approved by the Engineer.

- d. Check the thickness of the overlay prior to its initial set using a ruler. If the Engineer determines that the minimum thickness has not been attained, apply an additional layer with a minimum thickness of 1/4" after the overlay hardens at no additional cost to the Department.
7. Finishing.
- a. Texture the surface in accordance with Subsection 610.03(E)(4)(c)(iv).
8. Curing.
- a. Do not permit traffic and equipment on the overlay for a minimum of four (4) hours following final finishing. Protect overlay from moisture for a minimum of four (4) hours after finishing. Allow the polyester overlay 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 will be determined by the Engineer.

625.04 Method of Measurement.

Polyester polymer concrete overlay will be paid separately at the Contract Unit Price for furnishing and installation of the overlay.

625.05 Basis of Payment.

- A. Payment will be made for accepted quantities at the contract unit price as follows:

Item No.	Item Description	Unit
625501	POLYESTER POLYMER CONCRETE OVERLAY INSTALLATION	SY-IN
625502	FURNISHING POLYESTER POLYMER CONCRETE OVERLAY	CY

- B. Price and payment for furnishing overlay constitutes full compensation for furnishing all materials, including the technical representative, needed to construct the overlay.
- C. Price and payment for constructing overlay constitutes full compensation for the preparation of the area to receive overlay including scarifying, shot or grit blasting, removal of rust, oil and other contaminants, protecting the area, placing the bonding grout or primer coat, placing of concrete overlay, consolidating, curing, texturing, constructing and removing test patches, and for all labor, equipment, tools, and incidentals necessary to complete the work.

2/5/2018

710500 – WATER SERVICES

Description:

This work consists of furnishing, transporting, installing, and testing the water main, line, laterals, and accessories in accordance with the locations, details and notes on the Contract Documents, and as directed by the Engineer. The work shall be performed in accordance with these Special Provisions, Delaware Standard Specifications, and the requirements of the Standards and Specifications of Artesian Water Company. The Owner of the water utility is Artesian Water Company and for purposes of the water utility is referred herein as the Utility Owner. In case of conflict between these Special Provisions, Delaware Standard Specifications, and the Standards and Specifications of the Utility Owner, the Standards and Specifications and all other requirements of the Utility Owner shall prevail.

Materials:

Provide Materials as specified in the following:

Portland Cement Concrete, Class B	Section 1022
Backfill, Borrow Type C	Section 1001
Stone, Delaware No. 8	Section 1004

All the materials including pipe, fittings, and all other accessories as listed under this Special Provisions, shall conform to the material and quality requirements of the Standards and Specifications of the Utility Owner. The Utility Owner shall have right to inspect and reject the materials, if his/her specifications requirements are not met. It is recommended that the Contractor should contact the Utility Owner and get himself/herself familiarized with the applicable requirements of the materials required under this Contract before submitting his/her bid.

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

The Contractor shall transport, handle, and store pipe and fittings as recommended by manufacturer. New pipe and fittings that are damaged before or during installation shall be repaired or replaced, as recommended by the manufacturer or required by the Utility Owner. The costs of such repair or replacement shall be borne by the Contractor and be accomplished prior to proceeding with the project.

The Contractor shall deliver, store and handle other materials as required to prevent damage. Materials that are damaged or lost shall be repaired or replaced by the Contractor at no additional expense to the Utility Owner or Department.

WATER LINE MATERIALS

All watermain pipes, hydrants, valves, fittings and all appurtenances shall be new materials and shall be of the type, size, strength, and quality as shown on the plans and as specified herein and/or as indicated in the Special Provisions. The contractor may be required to secure and deliver to the Engineer a written statement from the manufacturer assuring the quality and compliance to the applicable specification of all materials furnished and installed under this improvement project. This shall in no way relieve the Contractor of any responsibility as to the quality of materials furnished and installed.

The Contractor shall install pipe made of virgin materials. The new pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

All standards and specifications referenced shall be the latest edition and version thereof. This includes AWWA, ASTM, ANSI, NSF and Federal specifications and standards. All construction work related to the installation of potable water pipe shall be performed by a licensed and bonded Contractor. Permits and licenses must be obtained prior to construction.

Warranty and Acceptance: Materials and workmanship shall have a one-year warranty to be free from

defects in workmanship and materials. The warranty will be from the date of completion of construction. If work has been done to the requirements of this specification, a letter of acceptance shall be provided to the contractor upon final inspection. If deficiencies are discovered during the warranty period, the Contractor shall be required to correct these deficiencies without additional charge to the Owner or his agent. The Project Engineer shall determine the need for warranty repair work to be performed by the Contractor. The Project Engineers determination of a deficiency will bind the Contractor to make a repair in accordance with this Contract.

- (A) PIPE BEDDING MATERIAL – Pipe bedding material shall be in accordance with DeIDOT Standard details.
- (B) DUCTILE IRON PIPE (DIP) – Ductile iron water mains shall be push on, Class 52, unless otherwise specified. DIP shall be centrifugally cast in lengths not less than 12 feet and no more than 20 feet, conforming to ANSI/AWWA C151/A21.51-81. Provide a minimum cover of 42 inches. DIP shall be cement lined in accordance with the requirements of ANSI/AWWA C104/121.4-80. A bituminous seal coating shall be applied to the interior and exterior as soon as the cement lining has sufficiently dried.
- (C) HIGH DENSITY POLYETHYLENE PIPE (HDPE) – HDPE water mains shall be IPS DR 11, unless otherwise specified. 4-inch HDPE shall conform to current AWWA C906, ASTM F714 and 2-inch HDPE shall conform to ASTM D3035, AWWA C901. Provide a minimum cover of 42 inches.
- (D) GATE VALVES
 - a. Main gate valves shall be Mueller A-2360 or H2370-20, open left, or approved equal
- (E) BUTTERFLY VALVES
 - a. Main butterfly valves shall be Mueller Linesal III Class 150B or approved equal.
- (F) VALVE BOXES – Valve boxes shall be Mueller H-10350, or approved equal.
- (G) DIP FITTINGS – DIP Fittings shall be ductile iron casting and have mechanical joints, Class 350 conforming to AWWA specification C153, covering compact fittings. Mechanical joints shall conform to AWWA Specification C111, latest revision, with gaskets made from vulcanized crude rubber compound. Fittings shall be cement lined and bituminous coated. Mastic spray is to be used where any uncoated pipe or fitting is exposed such as welds, Megalugs, scraped coating, etc.
- (H) BOLTS, NUTS & RODDING – All underground installed bolts, T-bolts, nuts and any rodding required shall be stainless steel, ASTM F 593 Type 316 for all watermain fittings including mechanical joints, hydrants, valves, tees, bends, taps, etc. No other type of bolts, nuts or rodding will be allowed unless approved in writing by the City Engineer.
- (I) HYDRANTS – Hydrant laterals shall be retraining tee, 6 inch resilient wedge gate valve and box with 6 inch ductile iron pipe. Hydrants shall be Waterous Pacer WB-67-250. Valve opening shall be 5 ¼ inch, open left. The muzzle arrangement shall be two 2 ½ inch hose connections and one 4 ½ inch pump connections, National Standard Thread. Lateral connection shall be 6 inch mechanical joint. Operating nut shall be 1 ½ inch pentagon.
- (J) TAPPING SLEEVES AND VALVES – Tapping sleeves shall be Mueller H-615, Mueller Stainless H-304. Tapping valves shall be Mueller H-687, open left. Tapping sleeves shall be a minimum of 6 feet from pipe joints or other fittings.
- (K) BUILDING SERVICES AND SERVICE SADDLES – Contractor shall be responsible for locating all water services; determining is active or abandoned; and confirming size and material. Locating and determining active status shall be incidental to the service connection item.
 - a. COPPER SERVICE PIPE - Type “K” 4” copper pipe shall be used for all small diameter building services conforming to AWWA. Copper is to be one continuous piece. No joints couplings, etc., allowed from main to curb stop. Minimum depth of cover is 42 inches.
 - b. CURB STOPS - Curb stops shall be Mueller H-15204, or approved equal.

- c. CURB BOXES - Curb boxes Mueller-HI0350, or approved equal.
 - d. METER YOKES – Meter yokes shall be Mueller HI412, or approved equal.
 - e. WATER METER – The large domestic meter (Master Meter) shall be 6” Badger FSAA-01 Fire & Domestic Service Water Meter Assemblies, or approved equal.
- (L) POLYETHYLENE ENCASUREMENT MATERIAL – Polyethylene encasement material shall conform to the requirements of AWWA C-105 for tube type installation and 8 mil nominal film thicknesses.
- (M) BENDS – All bends shall be concrete buttressed or utilize locking gaskets. Refer to construction details in the drawings.
- (N) RESTRAINED JOINTS – Restrained joints shall be provided at all transition connections. Restrained joints shall be MEGA-LUG series 1100 or approved equal. At locations where bends are required pre-cast thrust blocks. For connection between HDPE and DIP pipe, Contractor shall use a MJ Adapter for connection. Contractor is responsible for restraining DIP joints and fittings at alignment changes; at valve locations where a future tie-in may occur; at valve locations where existing pipe will be removed and replaced during future operations; and as shown on the drawings or required based on requirements of the construction details.
- (O) STIFFENERS INSERTS. Stainless steel stiffener inserts, ASTM 240, shall be used for all fittings and connections to HDPE pipe.
- (P) Backflow Preventer and Basket Strainer for Temporary Water Main and Hydrostatic Testing: Reduced pressure principal type, flanged and supplied complete with integral valves, following the American Society of Safety Engineers Standard No. 1013 and AWWA C510.
- a. Materials: Bronze, or liquid epoxy coated cast iron body with bronze and stainless steel working parts.
 - b. Pressure Requirements: Suitable for supply pressure as high as 175 psi and hydrostatic test pressure of 350 psi.
 - c. Manufacturers: Conbraco, Febco, Zurn Industries, Watts Regulator or approved equal.
 - d. Basket Strainers.
 - i. Installation: Inlet side of backflow preventer following Drawings.
 - ii. Strainers: Flanged ends, unless otherwise noted.
 - a. Strainer bodies: Ductile iron, gray iron, or bronze and designed to withstand maximum working pressure of 175 psi with tapped opening for flushing strained debris.
 - iii. Screens: Unless otherwise noted, stainless steel or brass sheet metal with ¼ inch perforations.
 - a. Open area of screen: At least 4 times inside cross-sectional area of pipe.
 - iv. Manufacturers: Hersey Products, Inc., Mueller Co., or approved equal.

JACK AND BORE

Casing Pipe shall be welded steel pipe, minimum 3/8-inch wall thickness, meeting the requirements of ASTM A 139, Grade B of the nominal diameter and length depicted on the Drawings. Casing pipe shall include a bituminous asphaltic coating on the exterior of the casing pipe applied at the manufacturing facility and re-applied as needed in the field if damaged during delivery or installation. Steel casing sections shall be connected by seam welding a butt joint. Field welding shall be performed in accordance with AWWA C206, Field Welding of Steel Water Pipe.

Casing Spacer shall be in accordance with the following requirements:

- Spacers shall be as shown on Contract Documents.

- Spacers shall be stainless steel.
- Spacers shall be bolt on style with a two-piece shell made from T-304 Stainless Steel of a minimum 14-gauge thickness.
- Shell shall be lined with a ribbed PVC sheet of a 0.090-inch thickness that overlaps the edges.
- Runners made from UHMW polymer, shall be attached to risers at appropriate positions to properly locate the carrier within the casing and to ease installation.
- Risers to be made from T-304 Stainless Steel of a minimum 14-gauge thickness and shall be attached to the shell by MIG welding.
- All welds shall be fully passivated.
- All fasteners shall be made from T-304 Stainless Steel.
- Model CCS as manufactured by Cascade Waterworks Manufacturing Company, Yorkville, IL. Or approved Equal.

Casing End Seals shall be in accordance with the following requirements:

- B) Casing end seals shall be installed to create a barrier from water and debris.
- Δ) The minimum thickness of seals shall be 1/8" of ethylene propylene diene monomer (M-Class) (EPDM) rubber, which conforms to ASTM Standard D-1418.
- Φ) The tensile strength shall be no less than 1,000 PSI.
- H) Bands shall be T-304 Stainless Steel.
- 9) Acceptable manufacturers:
 - b. Advance Products and Systems
 - d. Pipeline Seal and Insulator, Inc.
 - f. Approved Equal

Grout shall be in accordance with the following requirements:

- Cement: ASTM C150, Type I or Type II.
- Sand: ASTM C404, Size No. 1.
- Voids between Casing and Existing Ground: Minimum compressive strength of 100 psi, attained within 24 hours, and sufficiently fluid to inject through lining and fill voids, with prompt setting to control grout flow.
- For Carrier Pipe Bedding and Filling Annular Space between Casing Pipe and Carrier Pipe: 3 parts ASTM C144 sand, to 1-part ASTM C150 cement.

Patches for all appurtenances adjusted after the paving operations will require a perimeter reservoir and will be sealed in accordance with Section 504.

Special Requirements:

Coordinate all water service construction activities with the Owner including, but not limited to, requests for system shut downs and inspections. Provide the Owner with reasonable time to respond to requests for information and coordination. Submit (3 weeks prior to beginning the Work), for approval, a plan describing the logical sequence for water service shut-downs and tie-ins.

If necessary, furnish, install, and remove bypass and temporary services pipes to maintain water service to customers during the Work. Furnishing, installing services and other branches, maintaining, providing safety precautions and removal of temporary services is the responsibility of the Contractor and shall be included as part of the bid item as incidental to the cost of installing pipe. Use only the highest quality service pipe, connections and branches that are able to withstand 150 pounds per square inch pressures and all conditions of use. Ensure that all pipes and fittings are watertight, and that care is exercised throughout the installation to avoid pollution of mains, hose services or temporary service pipe.

Place temporary service pipe in the gutters where possible. Provide pipe crossings at driveways with cold patch cover or other methods approved by the Engineer. At street crossings, place temporary pipe in shallow trenches covered with temporary surfacing or other methods approved by the Engineer. Use sanitary precautions that are satisfactory to both the Engineer and the Owner. Chlorinate the interior of temporary service pipe in accordance with the latest AWWA Manual C601-81 "AWWA Standard for Disinfecting Water Mains". Chlorine and bacteria testing will be performed by the Owner's inspector.

The Owner and the Engineer retain the sole right of determining the times that the Work can occur and the

sequence of the Work. Do not begin Work until both the Owner and the Engineer grant permission to proceed. Notify the Owner a minimum of forty-eight (48) hours before beginning Work to allow the Owner to arrange inspection. Immediately notify both the Engineer and the Owner of all delays to the scheduled Work.

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

The Contractor will be permitted to close down specific water mains and services for a period of time not exceeding four (4) hours after obtaining approval from the Owner in order to make connections as shown in the Contract Documents. The schedule for making connections will be so arranged that the water users will be out-of-service for a minimum period of time. The Contractor will receive no additional compensation for working during off-peak hours.

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

Shutdowns are not permitted if tapping sleeves and valves are specified for making the connections. Any and all emergency repairs required are the responsibility of the Contractor. Upon notification via telecommunication from the Owner, attend to any repairs immediately. In the event the Owner is unable to contact the Contractor, or the Contractor fails to make the emergency repairs in a length of time determined by the Owner, the Owner reserves the right to attend to any or all emergency repair work. In such a case, the Contractor is responsible for reimbursements due to the Owner for the costs of the repairs.

Remove and replace or repair all Materials and Work, or parts thereof, which are deemed unsatisfactory as to any or all requirements of the Owner or the Engineer or as specified herein, at no expense to the State or the Owner.

Guarantee all workmanship, Materials and Work performed is in strict accordance with the Contract Documents, for a period of two years from and after the date of Completion and Acceptance of the Work. Repair, correct or replace as required, promptly and without charge, all Work, Equipment and Material, or parts thereof, which fail to meet the above guarantee, or which in any way fail to comply with or fail to be in strict accordance with the terms, provisions and requirements of the Contract during such two-year period.

Only designated Utility Owner personnel shall have the authority to operate any hydrants or valves that make up the Artesian Water Company water distribution system. Contractors shall not operate existing gate valves or hydrants. It is the Contractors responsibility to make arrangements for receiving water from public or private sources, secure necessary permits and pay regular charges. Under no circumstances shall existing hydrants be used to supply water other than to Utility Customers. The Contractor under the direction of the Utility Owner personnel shall do the initial filling of new water mains for service installations and testing. Disposal of any wastewater or any test water into New Castle County's sanitary sewer system is subject to New Castle County's charge. Prior written approval must be obtained from New Castle County.

Construction Methods:

Patches for all appurtenances adjusted after the paving operations will require a perimeter reservoir and will be sealed in accordance with Section 504.

The construction of the water main shall be a combination of open cut excavation and jack and bore.

- WATER PIPE INSTALLATION

1. WORKING HOURS – The Utility Owner shall be notified at least 48 hours prior to commencing any work. Contractors are subject to being shut down and or having work rejected if proper notification is not given to the Utility Owner. A schedule of work shall be submitted to the Engineer and Utility Owner prior to construction defining which portions of the contract will occur at night or during the day. Changes to this schedule should be made throughout the construction and reported immediately to the Utility Owner and Engineer. The definition of “Work” also includes the starting of equipment and the delivery of materials to the job site.
2. INSTALLATION OF PIPE AND FITTINGS – Watermain and water services shall be placed with a minimum of 42 inches of finished ground cover from the top of pipe to finished grade. The laying and jointing of water pipe shall be in accordance with the Contract Documents and the requirements of the Utility Owner's Specifications and as stated herein. All pipe and fittings shall be thoroughly cleaned before laying, in accordance with AWWA Standard C601-81 or the now current standard, and shall be kept clean until acceptance of the Work. No Work may be performed except under the supervision of the Utility Owner's inspector.

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

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

Where the manufacturer's recommended pipe joint deflection is exceeded, mechanical joint bends shall be required and installed to the satisfaction of the Owner and the Engineer at the Contractor's expense.

Thrust blocks are to be made of Portland Cement Concrete, Class B with a Concrete minimum strength 3,000 psi. Thrust blocks of adequate size and weight shall be used on all pressure piping for all fittings and all bends equal to and greater than of 11 - 1/4 degrees to resist the force of water pressure and water hammer. Thrust blocks (buttresses) shall conform to the details shown on the Plans and/or the Owner's Standard Specifications. Thrust blocks must be used unless the Owner's specifications or the Contract Documents permit a different method to secure the fittings. All methods used to secure fittings, including, but not limited to, thrust blocks, couplings and service saddles are incidental to the fittings and no separate payment will be made for this Work.

No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the Owner or the Engineer shall deem that there is danger of frost penetration at the bottom of the excavation. Keep all excavations free from water or other liquids during the progress of the Work. Excavate and backfill trenches per the applicable requirements of Section 207. Remove all excess Material in accordance with Section 106.08.

3. The Contractor shall keep all excavation free from water or other liquids during the progress of the work; and backfilling of trenches shall meet the applicable requirements of Section 207 of the DelDOT Standard Specifications.
 - a. Installation of Polyethylene Pipe (HDPE) and their appurtenances shall conform to the requirements of AWWA C906. The installation shall be to the bedding and backfill conditions specified by the Manufacturer, Plans, Specifications, or Special Provisions.
 - b. Installation of ductile iron water mains (DIP) and their appurtenances shall conform to the requirements of AWWA C-600 Specifications, the Plans, Specifications and Special Provisions.
4. PIPE LAYING OPERATIONS – Trench excavation and bedding preparations shall proceed ahead of pipe placement so as to permit proper placement and joining of the pipe and fittings at the prescribed grade and alignment without unnecessary hindrance. All foreign matter or dirt shall be removed from the inside of the pipe and fittings before they are lowered into position in the trench, and they shall be kept clean by approved means during and after laying. The water main materials shall be carefully lowered into laying position by the use of suitable restraining devices. Under no circumstances shall

the pipe be dropped or dumped into the trench. At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate to support the pipe throughout its length. No pipe material shall be laid in water or when the trench or bedding conditions are otherwise unsuitable or improper. When placement or handling precautions prove inadequate, in the Engineer's opinion, the Contractor shall provide and install suitable plugs or caps effectively closing the open ends of each pipe section before it is lowered into laying position, and they shall remain so covered until removal is necessary for connection of an adjoining unit. As each length of bell and spigot pipe is placed in laying position, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material, which shall be thoroughly compacted by tamping around the pipe to a height of at least 12 inches above its top.

Mechanically compact trenches in accordance with DeDOT standards. At all times when pipe laying is not in progress, including noon hour and overnight periods, all open ends of the pipe line shall be closed by watertight plugs or other means approved by the Engineer. If water is present in the trench, the seals shall remain in place until the trench is pumped completely dry. When connecting to existing stubs, the Contractor shall take every precaution necessary to prevent dirt or debris from entering the existing lines. All necessary work to make the connection shall be done at no additional compensation, except where noted otherwise.

5. POLYETHYLENE ENCASEMENT OF PIPELINE – For DIP water main, the pipeline, including valves, fittings, hydrant barrels, and appurtenances, shall be fully encased in polyethylene film meeting the requirements of these Specifications. The film shall be furnished in tube form for installation on pipe and all pipe-shaped appurtenances such as bends, reducers, off-sets, etc. Sheet film shall be provided and used for encasing all odd-shaped appurtenances such as valves, tees, crosses, etc. The polyethylene tubing shall be installed on the pipe prior to being lowered into the trench. Tubing length shall be sufficient to provide a minimum overlap at all joints of one foot or more. Overlap may be accomplished with a separate sleeve tube placed over one end of the pipe prior to connecting another section of pipe, or by bunching extra overlap material at the pipe ends in accordion fashion. After completing the pipe jointing and positioning the overlap material, the overlap shall be secured in place with plastic adhesive tape wrapped circumferentially around the pipe not less than three turns. After encasement, the circumferential slack in the tubing film shall be folded over at the top of the pipe to provide a snug fit along the barrel of the pipe. The fold shall be held in place with plastic adhesive tape applied at intervals of approximately three feet along the pipe length. Also, any rips, punctures, or other damage to the tubing shall be repaired as they are detected. These repairs shall be made with adhesive tape and overlapping patches cut from sheet or tubing material.

At odd-shaped appurtenances such as gate valves, the tubing shall overlap the joint and be secured with tape, after which the appurtenant piece shall be wrapped with a flat film sheet or split length of tubing by passing the sheet under the appurtenance and bringing it up around the body. Seams shall be made by bringing the edges together, folding over twice, and taping down. Wherever encasement is terminated, it shall extend for at least two feet beyond the joint area. Openings in the tubing for branches, service taps, air valves and similar appurtenances shall be made by cutting an X-shaped slit and temporarily folding back the film. After installing the appurtenance, the cut tabs shall be secured with tape and the encasement shall be completed as necessary for an odd-shaped appurtenance.

6. REACTION BACKING – Reaction backing shall be provided at all watermain fittings and at the hydrant in accordance with the typical backing detail shown on the standard details. In any instance where the Engineer determines that solid backing against undisturbed earth is not obtainable for fittings or hydrants, the Contractor shall use stainless steel tie rods, ASTM F 593 Type 316 or mechanical joint retainer glands as directed by the Engineer. Valves on branch lines or in hydrant leads shall in all cases be tied to an adjacent tee or cross fitting or back one full length of pipe.

7. EXCAVATION AND TRENCHING - Excavation shall be performed in accordance with Section 207 of the DeIDOT Standard Specifications and Excavation and Backfill for Pipe Trenches herein. The bottom of the trench shall be cut true and even, so that the barrel of the pipe will have a bearing for the full length. The trenches for water mains shall be excavated to such depth as will provide pipe elevations as indicated on the Water Main Relocation Profiles. The trenches for water service connections shall be excavated to the minimum standard depth or to such depth as required to connect to existing mains or service pipes. For pipe under 24-inch, internal diameter, the excavation (excluding rock), backfill and backfilling shall be included in the price for installation of the water main(s). Furnishing and borrowing shall be performed in accordance with section 210 of the Standard Specifications.

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

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

Patches for all appurtenances adjusted after the paving operations will require a perimeter reservoir and will be sealed in accordance with Section 504.

Where rock is encountered and blasting is required for trenching, all rock excavation work shall be performed in accordance with Section 206.03.06 of the DeIDOT Standard Specifications except as modified herein; and the trench shall be excavated an additional six inches below grade. After the excavation is completed, a bed six inches in depth of Borrow Type C shall be placed in the bottom of the trench, leveled off and thoroughly tamped. If blasting is required to remove the rock, perform blasting operations in accordance with Section 107.08 of the DeIDOT Standard Specifications.

8. EMERGENCY REPAIRS TO DAMAGED UTILITIES
 - a. Known or Field Located Utilities - In the event that the Contractor or his Subcontractor during the execution of the work breaks any known or field located pressure or gravity main causing the disruption of service and/or an eminent hazard, it shall be the responsibility of the Contractor/Subcontractor to immediately notify the Utility Owner at the designated emergency telephone number and immediately undertake measure to repair the damaged utility. To that effect the Contractor/Subcontractor shall ascertain prior to initiating the work that the necessary repair parts, tools, equipment, and labor are on ready and available onsite to complete the repair work without delays. The Utility Owner personnel and Engineer shall witness the repair work.
 - b. If the Contractor/Subcontractor estimates or determines that he is not going to be able to restore service within a less than two-hour period, the Contractor shall immediately contact the Utility Owner's manager to initiate repair.
 - c. The Utility Owner will undertake the repair work and will back charge the Contractor. The Utility Owner will submit an itemized bill within 30 calendar days from the occurrence of the event.
 - d. Unknown or Inaccurately Located Utilities - If the utility was not field located or it was inaccurately located in accordance with the prescribed procedures under the Sunshine State One-Call guidelines and the Contractor/Subcontractor cause a line break during the execution of the work, the same notification procedure as above must be followed. The Utility PCU Operations will undertake the repair work at no cost to the Contractor.
9. CONNECTIONS TO EXISTING MAINS: Only District personnel shall make connection to the existing water mains when and as directed by the District Inspector at the contractor's expense. In no case shall the Contractor shut off the water or operate the fire hydrants or gate valves of the existing distribution system without the expressed permission of the District Inspector. In case it becomes necessary to delay the cut-off, such instructions shall be given and obeyed without recourse. In making connections to the old distribution system, valves shall be set as shown on the plan, or at

such designated place as the Engineer may direct. If due to unforeseen conditions, these locations have to be changed or additional valves or fittings added, the Contractor shall install the valves or fittings at the new locations.

J) CONCRETE BLOCKING: All turns, fittings, fire hydrant connections, etc., that induce pressure which would cause separation of pipe, breakage, etc., shall be blocked with 3,000 lb. concrete. Blocking shall be formed and placed in such a manner that the pressure to be exerted at the point of blocking shall be transferred to firm, undisturbed earth at a maximum load of 2,000 lbs, per square foot. The Contractor shall insure that blocking at all tees, bends, plugs, etc., shall be sufficient to contain all pressure exerted by the pipe up to a pressure of 200 lbs. per square inch hydraulic pressure within the pipe, i.e. pressure at plug = 200 x (area of pipe in inches). The Contractor shall also be responsible for any damage or repairs caused by blowouts of any insufficiently blocked pipe. The contractor shall wrap all fittings, fire hydrant connections, etc. with District approved plastic wrap before any and all concrete pouring is started.

K) WATERMAIN TESTING - In order to assure quality materials and workmanship, the following tests shall be required unless waived by the Engineer. The Engineer or designee shall be present for all tests and shall be notified at least 48 hours in advance of the specific test. Testing shall be completed after all the utility pipes have been installed in the area to be tested and prior to commencement of the street construction. All tests shall be in accordance with CEAM standards or what is stated within this specification. Individuals qualified to perform and evaluate such tests shall do all testing. The Contractor shall pay for all tests required in these guidelines. Copies of the results shall be submitted to the Utility Owner. If inspection or test shows defects, including visible leaks, such defective work or material shall be replaced at the expense of the Contractor, and inspection and tests shall be repeated. All repairs shall be made with new material; failure to meet the tests specified above will be sufficient cause to reject the work until the defects are satisfactorily repaired. All expenses and costs incurred in carrying out the specified tests shall be borne by the Contractor at no extra cost to the Utility Owner or to the State and shall be included in the Contract unit price per linear foot bid for the various sizes of installing water main.

1. PRESSURE TESTING OF WATERMAIN - Hydrostatic pressure testing shall conform with AWWA C-605, latest revision as well as to the specifications of the Owner. Pressure testing shall be performed on all pipe, valves, hydrants, and fittings. The test shall be conducted on line segments from shut valve to shut valve in segments not exceeding 1,500 linear feet. The Contractor shall provide a suitable pump for applying pressure and an accurate gauge for measuring the pressure. The pipe shall be tested by applying one hundred fifty (150) pounds per square inch hydrostatic pressure for a period of two (2) hours with the Utility Owner's inspector present and to the full satisfaction of the Engineer. The maximum allowable leakage is in accordance with AWWA C605. Install any taps required at high points on the line to expel trapped air prior to testing. Following the tests, tightly plug all taps with suitable threaded brass plugs. Repair all visible leaks regardless of total leakage shown by test.

2. CONDUCTIVITY TESTING OF WATERMAIN - Conductivity testing of DIP watermain, copper straps or copper tipped gaskets shall be required to run at 350 amps for 5 minutes. PVC/HDPE watermain tracer lines shall be tested using standard underground utility locator, demonstrating that the lines can be located with standard equipment.

3. STERILIZATION OF WATERMAIN - The method to be used for sterilization shall comply with AWWA C 601-81, C 651, and Owner requirements, with the plugs used in the pressure test still installed in the pipe prior to placement into service. Extreme care is to be exercised in order to prevent the entrance of any contaminants into the main. All expenses and cost incurred in carrying out the specified sterilization work shall be borne by the Contractor at no extra cost to the Utility

Owner or the State and shall be included in the contract unit price per linear foot bid for the Water Main Installation.

4. BACTERIA TESTING OF WATERMAIN - Provide an adequate blowoff for use in flushing of the main. Before the water is turned on for use by the consumer from the relocated mains, the Owner will conduct bacteriological tests on water samples taken from the blowoff. All expenses incurred in the performance of these tests by the Owner are borne by the Contractor. Upon final sanitary approval by the Owner, return water service for use by the consumer. Before the final connection is made, thoroughly clean all surfaces of the relocated line, including all gaskets and glands, and the existing water main that are to become part of the closing joint with a 5 percent solution of Sodium Hypochlorite. Exercise extreme care in order to prevent the entrance of any contaminants into the main. All expenses and cost incurred in carrying out the specified sterilization work is borne by the Contractor at no extra cost to the Owner or the State and is included in the Contract Unit Price per linear foot bid for the Item for the various sizes. Plug adjacent pipe openings as required in accordance with the Section 202.03.2.

E) AS-BUILT / FINAL LOCATION DRAWINGS - Within thirty (30) days after completion of required work, the Contractor shall submit an accurate print or prints showing the horizontal and vertical location of mains, bends and other appurtenances to the Engineer and the Utility Owner. Services, fittings, fire hydrants and all other reconnections to the replaced pipes shall be identified and marked in the construction drawings by the Contractor. The Contractor shall be responsible for marking the construction drawings in reference to at least two fixed and easily found points.

- Jack and Bore

The pipe, whether casing or carrier, installed by means of Tunneling shall be installed to the line and grade specified on the Contract Drawings. Initial control information will be established prior to the initiation of work. As Tunneling proceeds, line and grade will be furnished on a scaled drawing at intervals not exceeding twenty (20) feet by the Contractor. The Contractor shall use this information to project the alignment ahead until subsequent references can be set.

If a pilot hole is to be tunneled, the pilot hole shall not deviate greater than 5% of depth over the length of the tunnel unless previously agreed to by the Engineer. In the event that the pilot hole does deviate greater than required, the Engineer may require the Contractor to pull back and re-tunnel from the location along the path prior to deviation.

Bore so as not to interfere with, interrupt, or endanger surface and activity thereon. Minimize subsidence of surface, structures, and utilities above and in vicinity of bore. Support ground continuously to prevent loss of ground and keep perimeters stable. Be responsible for settlement resulting from operations. Repair and restore damaged property to its original condition before being disturbed at no cost to the OWNER.

The approach and receiving trenches shall be excavated, and the pipe placed at the elevation and grades specified, in accordance with the Drawings and Contract Documents. Boring shall be performed in the downstream direction.

Boring shall be installed to grade and line indicated on the contract documents. Jack and bore operation shall be monitored via censoring devices to ensure correct grade and line installation. There shall be a 1-inch tolerance for grade elevations of the casing and carrier pipes.

The casing pipe shall be pushed in to the ground with a boring auger rotating within the pipe to remove the spoil. The cutting head shall not be advanced ahead of the casing pipe except for that distance necessary to permit the cutting teeth to cut clearance the pipe.

The overcut of cutting head shall not exceed more than ½ inch. If unstable soil is encountered during the boring procedure, the cutting head shall be retracted into the casing to maintain a balance between the pushing pressure and the ratio of pipe advancement to quality of soil. The Contractor shall use a steering system to ensure grade is met, on a single pass. Pilot tube guided boring is not acceptable.

If voids should develop greater than the outside diameter of the pipe by approximately one (1) inch, the Contractor shall fill the voids with approved pressurized grout material.

When augers and cutting heads or similar devices are used for advancing the casing pipe, the front of the pipe shall be provided with mechanical arrangements or devices that will prevent the auger and cutting head from leading the pipe (so that there will be no unsupported excavation ahead of the pipe). The auger and cutting head arrangement shall be removable from the pipe in the event an obstruction is encountered. The operation shall be continuous until the casing is installed.

Direction of jack and bore shall be monitored via sensing devices to ensure correct grade and line installation. A thrust wall shall be constructed normal to the proposed line thrust. The thrust load shall be imparted to the pipe through a suitable thrust ring that is sufficiently rigid to ensure distribution of the thrust load on the pipe. The thrust wall and jacking system shall be designed to carry the thrust of the jacks to the soil without excessive soil deflection and in such a manner as to avoid any disturbance of adjacent structures or utilities.

Dewatering shall be performed by the Contractor in compliance with all applicable local, State and Federal rules, regulations and ordinances. Surface drainage shall be diverted away from the execution through the use of dikes, ditches, pipes, sumps, or other means. When water is encountered, develop and maintain dewatering system of sufficient capacity to remove water continuously, keeping excavations free of water until backfill operation is in progress.

Keep removal of soil to a minimum. Dewater in accordance to Contract Documents. Observe settlement or displacement of surface facilities due to dewatering. Should settlement or displacement be detected, notify Engineer immediately and act to maintain safe conditions and prevent damage.

Carrier pipe shall be installed in the casing pipe with restrained joints, and as illustrated on the Contract Drawings. The carrier shall be supported within the casing so that no external loads are transmitted to the carrier pipe. The ends of the casing pipe shall be sealed to provide a barrier against debris and seepage.

After carrier pipe and spacers are installed, the annular space shall be filled with grout.

Method of Measurement and Basis of Payment:

Price and payment for water service Items includes furnishing, transporting and installing the Materials; adjusting, relocating or repairing the services, testing of the water main system; for repairing leaks and defects, including defects to settlement, connecting to existing water main systems and services; maintaining service as required; excavating; jack and bore installation; disposing of excess excavated Material; backfilling; furnishing Material for backfilling; furnishing and installing concrete thrust blocks, joint restraints, pipe bedding, sheeting and shoring, temporary support of existing Utilities, dewatering; abandoning existing pipes, cutting and capping new or existing lines and for all labor, Equipment, tools and necessary incidentals to achieve and accept an operational water main system.

No separate payment shall be made for salvaging or abandoning or removing and disposing of existing water mains and cost for such required work shall be incidental to the respective sizes for installing water main.

A breakout sheet attached to the Proposal lists the different elements of work or materials involved in completing this item. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The Lump Sum cost for Item 710500, shall be derived from the total sum of the cost of all items listed. The breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the bid being declared non-responsive and rejected.

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

All lump sum pay items will be prorated for each pay estimate. A percentage of the lump sum item will be paid, on a monthly basis, based upon the amount of work completed and accepted by the Engineer.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
710500	WATER SERVICES	LS

3/27/29

711500 - ADJUST AND REPAIR EXISTING SANITARY MANHOLE

Description:

This work consists of adjusting and repairing existing sanitary manholes in accordance with notes and details on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall conform to the applicable requirements of Section 711 of the Standard Specifications, and the Standard Specifications of the owner of the sewer system. If there is a conflict between the Department's Specifications and the Specifications of the owner, the latter will prevail.

Method of Measurement and Basis of Payment:

The method of measurement and basis of payment for the item shall be made in accordance with Subsections 711.04 and 711.05 of the Standard Specifications.

1/4/17

711501 - SANITARY SEWER SYSTEM

Description:

Furnish, transport, provide bypass pumping, install, backfill using type C borrow, and test a sanitary sewer system in accordance with the Contract Documents, these Special Provisions, DelDOT Standard Specifications, and requirements of the Standard Specifications of the Utility Owner (New Castle County). This work includes but is not limited to construction via open trench and jack and bore of gravity sewer pipe and sewer casing pipe, installation of forcemain and thrust restraints, backfill using type C borrow, installation and adjustment of manholes, bypass pumping, pumping and hauling, gravity laterals, lateral cleanouts, and sewer plugs.

In case of any conflict between the notes and details on the Plans; Special Provisions; Standards and Specifications of the Utility Owner; the Standards and Specifications of the Utility Owner shall prevail.

The Contractor shall obtain the Standards and Specifications of the Utility Owner and study for materials cost before submitting the bids. The Utility Owner of the sanitary sewer is New Castle County.

General Requirements:

All work shall be subject to inspection and subsequent approval/disapproval of the engineer and the representative of the Utility Owner; and the contractor shall be required to correct the discrepancies at his/her expense.

Included in this work are the connections of all existing commercial, industrial, and residential sanitary sewer services to the new sanitary sewer system. All modifications to such services, as required by the present Standards and Specifications of the Utility Owner and all relocations of such services necessary to avoid conflicts with utilities and highway drainage facilities are included in the work. Since the exact locations of the conflicts cannot be determined prior to trench excavation operations, the Contractor must coordinate and schedule any required relocation efforts of each sanitary sewer connection on an individual basis with the Utility Owner and the property owner. The Contractor shall be responsible for locating all services and determining whether each service is active or abandoned. Locations shown on drawings were provided by the utility owner and may or may not reflect actual field conditions. All costs associated with determining locations and active/abandon status of the service laterals will be incidental to the contract.

Coordinate all sanitary sewer construction activities with the Owner including, but not limited to, requests for system shut downs and inspections. Provide the Owner with reasonable time to respond to requests for information and coordination. Submit (3 weeks prior to beginning any Work) for approval of a plan describing the logical sequence for sanitary sewer shut-downs and tie-ins.

It is of prime importance that the Contractor, in the performance of his/her work, does not disrupt the operation of the existing sanitary sewer facilities in any manner or at any time, without the expressed prior approval of the Utility Owner. The Contractor shall construct, maintain, and remove following construction temporary bypasses as may be required during construction to maintain sanitary sewer facilities in service. In addition, Contractor shall pump and haul sewage as required to maintain sanitary sewer service. No separate payment will be made for such temporary bypasses or pumping and hauling.

The Contractor shall provide at least two (2) telephone numbers where his designated personnel can be reached 24 hours a day in case of an emergency. The Contractor shall provide temporary lighting for maintenance and repairs at night. The Contractor shall provide adequate standby equipment installed and ready for immediate operation and use in the event of an emergency or breakdown.

One standby bypass pump system for each pump system utilized shall be installed at the bypass location ready for use in the event of primary pump system failure. Each stand-by pump system shall have an automatic start/stop control. The bypass pumping system shall be capable of bypassing the flow around the work area for satisfactory performance of work.

All lateral connections will be treated in the same manner as mainline sewers. Each will have a temporary sump, pump and stand-by pump to transfer flows to a mainline manhole. It is essential to the operation of the existing sanitary sewer system that there be no interruption in the flow of sanitary sewer throughout the duration of the project. To this end, the Contractor shall provide, maintain and operate all

temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing sewer downstream of his work. Sewage shall be pumped from existing upstream manholes to downstream manholes.

The design, installation and operation of the bypass pumping system shall be the Contractor's responsibility. The bypass pumping system shall meet the requirements of all codes and regulatory agencies having jurisdiction. The Contractor shall provide all necessary means to safely convey the sewage around the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances. The Contractor shall maintain sanitary sewer flow around the work area in a manner that will not cause surcharging or damage of the existing sewer system and that will protect public and private property from damage and flooding.

Any and all emergency repairs required during the period of this Contract shall be the responsibility of the Contractor. In the event the Utility Owner is unable to contact the Contractor for the immediate emergency repair items of work, or in the event the Contractor does not take action when contacted within 24 hours, the Utility Owner reserves the right to attend to any and all emergency repair work items and to resubmit the costs directly to the Contractor for complete payment.

The installation requirements for the sanitary sewer system include both open-cut and jack and bore methodology for gravity sewers.

The contractor shall furnish all labor, supervision, material, tools, equipment, supplies, and services; and shall perform all Work necessary for the installation of a casing pipe by bore and jack methods. The casing pipe shall be constructed in accordance with the Contract Documents and the applicable laws, rules, ordinances, standards of New Castle County Special Services, the State of Delaware, Federal Government, OSHA 29CFR 1926, building codes, applicable criteria of ANSI A10.16-1995(r2001) (Safety Requirements for Tunnels, Shafts, and Caissons), and regulatory agencies, and specifications of the Owner.

Materials:

The requirements for the materials as applicable to the Contract are as noted below, unless otherwise stated on the Plans and/or required by the Utility Owner of the sewer system. The Contractor shall verify the compatibility of these materials specifications with the Utility Owner before placing order for the Contract. The Owner will have right to inspect Materials and reject any Materials that do not meet the applicable standards and specifications.

Provide all Materials to complete the Work including pipe, fittings, manholes, cleanouts, fill, plugs, and all other appurtenances necessary to make permanent connections to existing utility facilities of whatever material type encountered.

Gravity Piping

The Polyvinyl Chloride Pipe (PVC pipe) suitable for non pressure drainage of sewage and fittings shall be of SDR 26 of the nominal size required by the Plans or as required/approved by the Utility Owner.

All PVC pipe and fittings shall be manufactured in accordance with the latest version of the following ASTM Specifications:

1. ASTM D3034, "Standard Specification for Type PSM PVC Sewer Pipe and Fittings."
2. ASTM F679, "Standard Specification for PVC Large-Diameter Plastic Gravity Sewer Pipe and Fittings."
3. ASTM F1336, "Standard Specification for PVC Gasketed Sewer Fittings."
4. ASTM D3212, "Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals."

All PVC pipe joints shall be gasketed, bell-and-spigot, push-on type. Gaskets shall be part of a complete pipe section and furnished as such. Gaskets may be factory installed or field installed as recommended by the pipe manufacturer. Lubricant shall be as recommended by the pipe manufacturer. Provide elastomeric gasket joints in accordance with ASTM F477.

All PVC non-pressure sewer pipe shall have a maximum standard dimension ratio (SDR) of 26. All PVC non-pressure sewer pipe shall have a pipe stiffness that equals or exceeds 115 lbs/in² (PSI).

Each pipe shall be marked at intervals of five (5) feet or less to designate compliance with applicable ASTM or AWWA specification. The pipe shall be as uniform as commercially practicable in color, capacity, density and other physical properties and provided by a single Contractor.

Lateral connection fittings shall be made using a manufactured "wye" connection, constructed of the same class and material as the gravity main to which they are connected.

Unless shown otherwise on the Plans or required by the owner, all commercial, industrial, and residential connections shall be constructed of the same class of material as the sewer mains to which they are connected. Minimum grade and size of the lateral pipes shall be as required by the Owner's Standards and Specifications.

Force Main Piping

All PVC pipe, fittings and appurtenances shall be provided as depicted on the Contract Drawings.

All PVC pipe and fittings intended for pressure sewer shall be manufactured in accordance with the latest version of the following AWWA Specifications:

1. Pipe: AWWA C900 or C905, for gasketed joints and using ASTM F 477 elastomeric seals.
2. PVC Fittings: AWWA C907, for gasketed joints and using ASTM F 477 elastomeric seals.
3. Standard Ductile Iron Fittings: AWWA C110, ductile or gray iron.
4. Compact Ductile Iron Fittings: AWWA C153.

Pipe Appurtances

All pipe and lateral repair couplings suitable for non-pressure sewer repairs shall be manufactured in accordance with the following requirements:

Gaskets shall be accordance with the following requirements:

1. ASTM D 5926 - Standard Specification for Poly Vinyl Chloride (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems
2. ASTM C 1173 - Standard Specification for Flexible Transition Couplings for Underground Piping Systems
3. Hardness, Shore "A," Inst. \pm 5.....65
4. Tensile Strength, Min. psi1000
5. Elongation at Rupture, Min. %.....250
6. Tear Strength, Min.....150 lb/in.
7. Brittleness Temperature.....-40°F

Clamps shall be in accordance with the following requirements:

1. Manufactured to the requirements of CSA B602
2. Clamp Housing- 301 Stainless Steel
3. Clamp Band - 301 Stainless Steel
4. Clamp Screw - 305 Stainless Steel
5. Installation torque - 60 inch-pounds

Shear Rings shall be in accordance with the following requirements:

1. 0.012" Thick, 300 Series Stainless Steel
2. Width manufactured according to coupling width (1.50 inches, 2.13 inches, or 4.0 inches)
3. Length manufactured according to coupling diameter
4. Clamps spot welded in place

Coupling shall be in accordance with the following requirements:

1. ASTM C 1173 - standard specification for flexible transition couplings for underground piping systems
2. Maximum test pressure: 4.3 PSI
3. Maximum operating temperature: 140° F non-consistent

Sewer Plugs shall be in accordance with the following requirements:

1. Maximum test pressure: 4.3 PSI
2. Maximum operating temperature: 140° F non-consistent

Backfill and Trenching

All trenching and backfill materials, including those not listed herein shall be included under this item.

Trench material shall match those shown on Contract Drawings and New Castle County Standard Details.

Use Borrow, Type C for backfilling conforming to the Contract Drawings and DelDOT Standard Details. For sewer bedding, aggregate material shall be in accordance with AASHTO M43 and shall be used where specified on the Drawings or as required by the Engineer. Aggregate material shall be furnished from a specific source or sources approved by the Engineer.

Warning tape for sanitary sewer shall be printed polyethylene plastic tape with a metallic core, manufactured specifically for warning and identification of buried utility lines. The tape shall be of a roll type, 6" minimum width, and color-coded for sewer (green), with warning and identification imprinted in bold black letters continuously and repeatedly over entire length of tape. The code and letter color shall be permanent and unaffected by moisture and other substances contained in trench backfill materials. Imprinted on the tape shall be "Caution, Buried Sewer Line Below", or a similar message as approved by the Engineer.

Force Main Pipe Appurtances

Pressure-Type Pipe Couplings shall be in accordance with the following requirements:
Metal, bolted, sleeve-type, reducing or transition coupling, for joining underground pressure piping. Include 150-psig minimum pressure rating and ends of same sizes as piping to be joined.

1. AWWA C219,
2. Center-Sleeve Material: Manufacturer's standard.
3. Gasket Material: Natural or synthetic rubber.
4. Metal Component Finish: Corrosion-resistant coating or material
5. Hardware: Type 304 Stainless Steel

Joint Restraints shall be in accordance with the following requirements:

1. AWWA C111
2. Minimum ASTM A536, 60-42-12 ductile iron.
3. Restraint devices shall be coated with a corrosion resistant epoxy
4. Pressure rating that meets or exceeds the pressure rating of the pipe and the design shall incorporate a 2 to 1 safety factor.

Mechanical Joint Restraints shall be incorporated into the design of the follower gland. AWWA C110

Flanged Joint Restraints shall be stainless steel hardware and ANSI B16/5 Class 150/125 Drilling Pattern.

Pipe joints shall be restrained if they connect pipe with fittings, valves or tank structures or if they lie within 25 feet of such a connection and as shown on the Contract Drawings.

Polyethylene Sheeting shall be ASTM D 4397, with at least 8-mil thickness

Detectable Pipeline Wire: Pipeline detectable wire shall be installed continuously along pipe. Wire shall be HDPE insulated (green), solid copper or copper clad steel, #12 AWG, 600 volt, of not less than 98% conductivity, and rated for direct burial.

Splicing shall be done with water and corrosion proof wire connectors rated for direct burial. Wire to be brought up to the surface at the beginning and termination of the pipe, all tracer stations and at any in-line valves (interior of the valve box).

Sanitary Sewer Manholes

Pre-cast manholes shall be provided as specified herein and as depicted on the Contract Drawings. References of specific product manufacturers may be used to depict a material style and quality expected for this project.

The quality of all materials, the process of manufacture, and the finished precast manhole or structure is subject to inspection by the Engineer. The Owner or Engineer may make such inspection at the place of manufacture, on the work after delivery or at both places. The Owner or Engineer may reject any precast manholes or structures at any time on account of failure to meet any of the specifications' requirements even though sample manhole sections may have been accepted as satisfactory at the place of manufacture.

The Owner reserves the right to core manholes either at the job site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength and/or indicate incorrect placement of reinforcing steel, the Owner reserves the right to reject all sections not previously tested until conformance to these requirements is substantiated. Additional core testing will not result in an increase to the Contract Amount.

Locations, sizes, penetrations, depths and all other attributes of each manhole shall be confirmed by the Contractor prior to ordering. Provide manholes of 4,000 psi concrete, cementitious materials, aggregates and steel reinforcement conforming to ASTM C 478 for sewer manholes.

Manhole benches of new manholes shall be made at the manufacturing site using concrete conforming to the requirements for precast sections. At the discretion of the Engineer, manhole benches may be constructed in the field using concrete conforming to the requirements for precast sections or sewer brick and mortar. The manhole bench shall be smooth and sloped toward the channel at one inch per foot. The bench shall be coated with a cementitious crystalline waterproofing sealant.

Manhole channels of new manholes shall be precast, with a smooth, semicircular bottom that extends upward to the height of the pipe crown. At the discretion of the Engineer, manhole channels may be constructed in the field using sewer brick and mortar.

Manhole riser and/or base sections shall include properly located penetrations for making connections to sewer pipes. Unless otherwise depicted or permitted by the Engineer, provide 6 inches minimum distance between a joint in a manhole section and the nearest edge of an opening for a connecting sewer. The diameter of such openings shall not be more than 4 inches larger than the outside diameter of the pipe to be connected.

Manhole Appurtenances

Manhole O-ring Gaskets and Sealing Compound shall be in accordance with the following requirements:

1. Joints between manhole sections shall be sealed with a flexible, watertight gasket that meets or exceeds ASTM C443.
2. Joints shall also include a joint sealing compound that meets or exceeds ASTM C990 and AASHTO M-198.
3. Provide trowelable grade butyl-rubber base backplaster material to seal exterior manhole joints and adjusting rings that meets or exceeds ASTM C990.

Pipe to Manhole Connectors shall be in accordance with the following requirements:

1. The design of the connector shall provide a flexible, watertight seal between the pipe and concrete structure and shall be integrally cast into the manhole unless otherwise specified.
2. The connector shall be made from materials that conform to Section 4, "Materials and Manufacture" of ASTM C-923 and F-2510 "Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Laterals", and the overall design will meet or exceed Section 7, "Test Methods and Requirements" of ASTM C-923.
3. The connector shall be sized specifically for the type of pipe being used and shall be installed in accordance with the recommendations of the manufacturer.
4. Any metal elements of the connector shall be non-magnetic Series 300 stainless steel.
5. "Boot-type" connectors shall not be used unless specified or reviewed by the Engineer.

Grade Adjustment Rings shall be in accordance with the following requirements:

1. Grade adjustment rings used in the public road right of way must be approved by DELDOT.
2. Precast concrete adjusting rings shall meet or exceed ASTM C478.
3. Rubber composite adjustment rings shall meet or exceed the following:
 - a) Density - 64 lbs/ft³, ASTM D3574-05 Test A
 - b) Durometer Hardness - 77 A ± 5, ASTM D2240-05
 - c) Tensile Strength - Not less than 145 psi, ASTM D412-06
 - d) Heat Ages Properties - 70 hours @ 158 °F, 3 hours @ 300 °F, ASTM D573-04
4. Expanded polypropylene adjustment rings shall meet or exceed ASTM D3575.

5. High density polyethylene (HDPE) adjustment rings shall meet or exceed ASTM D4976 and ASTM D1248.

Manhole Frames and Covers

Provide New Castle County standard manhole frames and covers conforming to ASTM A 48, Class 35B.

Manhole Steps and Ladders

Provide manhole steps or ladders as depicted on the Contract Drawings as conforming to ASTM C478. Unless otherwise specified, provide polypropylene steps with a reinforced 3/8- inch minimum diameter reinforcing steel, grade 60. Do not use cast iron steps.

Jack and Bore

Casing Pipe shall be welded steel pipe, minimum 3/8-inch wall thickness, meeting the requirements of ASTM A 139, Grade B of the nominal diameter and length depicted on the Drawings. Casing pipe shall include a bituminous asphaltic coating on the exterior of the casing pipe applied at the manufacturing facility and re-applied as needed in the field if damaged during delivery or installation. Steel casing sections shall be connected by seam welding a butt joint. Field welding shall be performed in accordance with AWWA C206, Field Welding of Steel Water Pipe.

PVC Sewer Pipe shall have with joint restraints and otherwise match the stated requirements in this specification.

Casing Spacer shall be in accordance with the following requirements:

1. Spacers shall be as shown on Contract Documents.
2. Spacers shall be stainless steel.
3. Spacers shall be bolt on style with a two-piece shell made from T-304 Stainless Steel of a minimum 14-gauge thickness.
4. Shell shall be lined with a ribbed PVC sheet of a 0.090-inch thickness that overlaps the edges.
5. Runners made from UHMW polymer, shall be attached to risers at appropriate positions to properly locate the carrier within the casing and to ease installation.
6. Risers to be made from T-304 Stainless Steel of a minimum 14-gauge thickness and shall be attached to the shell by MIG welding.
7. All welds shall be fully passivated.
8. All fasteners shall be made from T-304 Stainless Steel.
9. Model CCS as manufactured by Cascade Waterworks Manufacturing Company, Yorkville, IL. Or approved Equal.

Casing End Seals shall be in accordance with the following requirements:

1. Casing end seals shall be installed to create a barrier from water and debris.
2. The minimum thickness of seals shall be 1/8" of ethylene propylene diene monomer (M-Class) (EPDM) rubber, which conforms to ASTM Standard D-1418.
3. The tensile strength shall be no less than 1,000 PSI.
4. Bands shall be T-304 Stainless Steel.
5. Acceptable manufacturers:
 - a. Advance Products and Systems
 - b. Pipeline Seal and Insulator, Inc.
 - c. Approved Equal

Grout shall be in accordance with the following requirements:

1. Cement: ASTM C150, Type I or Type II.
2. Sand: ASTM C404, Size No. 1.
3. Voids between Casing and Existing Ground: Minimum compressive strength of 100 psi, attained within 24 hours, and sufficiently fluid to inject through lining and fill voids, with prompt setting to control grout flow.
4. For Carrier Pipe Bedding and Filling Annular Space between Casing Pipe and Carrier Pipe: 3 parts ASTM C144 sand, to 1-part ASTM C150 cement.

Bypass Pumping

A dual pump system shall be used with each pump provided capable of handling the full flow required. The bypass pumping system shall have sufficient capacity to pump the peak flow provided by the County. This flow number is based on best available information at the time. Contractor should perform independent evaluation prior to beginning work. The Contractor shall provide all pipeline plugs, pumps of adequate size to pump peak flow, and temporary discharge piping to ensure that the total flow of the sanitary sewer can be safely diverted around the work.

Bypass pumping systems will be required to operate 24 hours per day. During overnight operation, an auto-dialer and automatic alarm activation shall be provided. All pumps shall be fully automatic, self-priming or submersible units that do not require foot-valves or vacuum pumps in the priming system. The pumps may be electric motor driven or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of sanitary sewer flow

The Contractor shall provide the necessary stop/start controls for each pump. The controls shall include automatic start up on a high level and stop on a low level. The Contractor shall include one stand-by pump system of equal capacity for each temporary bypass pump system to be maintained on site.

Each stand-by pump shall have a separate backup discharge pipe, for a total of two (2) discharge pipes. These discharge pipes shall be protected from flooding. In order to prevent the accidental spillage of flows all discharge systems shall be constructed of steel pipe utilizing quick-disconnect joints, or fused, high-density polyethylene pipe. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the County or their representative. The piping will provide an easily moved system to facilitate the work progress of the Contractor's schedule.

The Contractor shall provide equipment with residential mufflers and sound baffles for overnight operation near residences. Sound levels five (5) feet from operating pumps shall be no greater than 70 dBA.

Construction Methods:

Open Trench

The excavation and backfill for the pipe shall be performed in accordance with the applicable requirements including backfill requirements of Section 612 of the Delaware Standard Specifications, unless otherwise modified on the Plans, or in conflict with the requirements of the Utility Owner. If there is a conflict between the Delaware Standard Specifications (including these Special Provisions) and the Specifications of the Utility Owner, the latter will prevail. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Utility Owner. The pipe shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Engineer.

During backfill of the sewer main the Contractor shall install the specified warning tape at a depth of 8" to 12" below finished grade or as directed and approved by the Engineer/Owner.

Lengths of pipes shown in the Contract Documents are estimated only. The Contractor is responsible to layout the tie-in areas in the field and fabricate the bends and pipe lengths required to properly tie-in to other pipes, fittings and/or manholes as required and approved by the Engineer. Thoroughly clean all pipes and connecting Materials before placement. Keep all pipes and connecting Materials clean until the completed Work is accepted.

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

The Contractor shall build all future service connections to the existing houses, businesses, and others, complete to the property line, right-of-way lines or other designated points. The ends of all such service connections shall be closed with plugs as directed and approved by the Engineer/Owner.

Sheeting and bracing required for trenches shall be removed to the elevation of the conduit, but no sheeting will be allowed to be pulled, removed, or disturbed below the conduit. Sheeting and bracing shall meet OSHA requirements.

Before lowering into the trench, the pipe shall be inspected for defects. All cracked, chipped, or broken pipe shall be discarded. The ends and interior of the pipe shall be clean. Belled ends shall be laid upgrade. Handling of the pipe shall be accomplished in a manner that will not damage the pipe. The joint shall be made in the manner recommended by the manufacturer. Care shall be taken not to buckle or disturb previously laid pipe.

Pipe jointing shall be as specified herein, and per manufacturer's recommendation for the pipe material used for this project. Bell and spigot and/or push-on joints and gaskets shall be thoroughly cleaned and lubricated in accordance with manufacturer's recommendations. The Contractor shall ensure that the pipe is sufficiently joined as to create a water tight seal. Whenever a pipe requires cutting to fit into the line or to bring it to the required location, the work shall be done in a satisfactory manner so as to leave a smooth end without extra compensation.

Each joint shall be inspected to ensure that it is properly made before backfilling is done. Care shall be taken to prevent any dirt or foreign matter from entering the open end of the pipe. Where it is necessary to cut pipe, such cuts shall be neatly made in an approved manner. The laid pipe shall be true to line and grade and, when completed, the sewer shall have a smooth and uniform invert. No section of gravity sewer, including service connections shall have an adverse grade which would pond water in the invert or any other portion of the sewer.

The Contractor shall lay pipeline starting at the lower elevation of a run and proceed upgrade unless otherwise specified or directed by the Engineer. Lay all pipe with bells (if present) pointing upstream. Lay all pipelines in trench excavations on bedding as specified, concrete cradle or other foundations as shown on the Contract Drawings or directed by the Engineer.

Carefully place each pipe and check for alignment and grade. Make adjustments to bring pipe to line and grade by scraping away or filling in bedding material under the barrel of the pipe. Support by wedging or blocking the pipe barrel is not permitted. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely push the pipe together. Shape bell holes in the bedding material for each joint as required allowing the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.

As the work progresses, clean the interior of pipelines of all dirt and superfluous materials. Properly secure the pipe against movement and make the pipe joints in the excavation as required. Carefully grade and compact pipe bedding by hand around the pipe, ensuring pipe haunches are properly supported.

Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed and are not ready to connect.

Pipe shall be laid accurately to the staked line and grade. All service connections shall be installed as indicated on the Drawings right-of-way. Where existing service sewers are to be connected, suitable fittings and adapters shall be provided by the Contractor.

Pipe shall be cleaned of all foreign matter, and water shall be kept out of trenches until joints have been completed. When work is not in progress, open ends of pipe and fittings shall be securely closed to keep foreign matter and animals from entering.

Connections to existing pipe shall be made with Fernco Strongback Coupling or approved equal.

Connectors must be approved by the Engineer prior to installation.

The Contractor shall determine the location of existing sewer services prior to installation of the mainline pipe in such a way that the service wyes can be installed in the proper location as the mainline pipe is being installed. The Contractor shall be responsible to verify the locations of the lateral in the field and determine if the lines are active or abandoned. Inactive lines or abandoned lines will not be replaced as approved by the Utility Owner. No service saddles will be permitted, unless approved by the Engineer.

Connections to existing sewer mains, service connections, and manholes shall be made in such a manner so as to not damage the existing facility. Such connections shall be made so that no projections or rough surfaces occur within the pipe.

Prior to constructing the tie-ins, coordinate with the Owner and, if required by the Owner, be prepared with tanker trucks and pumps to handle any excess flow during the transition. The Owner must be satisfied with the Equipment and tanker trucks provided on site before allowing the actual tie-in. Pump all excess flow into the tankers and properly dispose of the excess flow at an approved location.

Locations of the sewer laterals are approximate and may be changed by the Engineer. Relocating of the sewer lateral will not add extra cost to the Utility Owner or State, unless either of the following conditions result:

1. The relocation results in an increase in the length of the lateral; or,
2. A change in construction methods is required from the change in lateral location

If the Contractor believes that the work at the new location(s) will result in a substantive change, the Contractor shall notify the Engineer prior to beginning the changed work. The Engineer will evaluate the request and if the relocation is warranted, the change in work shall be authorized. Lateral connections shall be laid such that flow from the lateral shall be in the same direction as the gravity main.

The Contractor shall reconnect all active service connections as approved by the Utility Owner. Service connections shall be reconnected to the pipe by using connectors approved by the pipe manufacturer and in conformance with the specified installation procedure.

Connections to the existing service pipe shall be made using flexible couplings. All flexible couplings shall conform to ASTM C425. Joint deflection limits and lateral connections shall meet the maximums indicated in ASTM C12 and C425.

The slope of the existing lateral toward the newly installed sewer main shall be maintained at the existing percent. For reconstructed laterals, a minimum slope of two percent (2%) or as specified by the Utility Owner is required.

Lateral connections to existing sewer mains shall not obstruct flow.

Maintain a minimum of 18 inches of vertical clearance where the water main or storm sewer crosses over the sanitary sewer or lateral; otherwise, a minimum of ten (10) foot long concrete encasement (centered at the crossing point) shall be provided around the sanitary sewer or lateral as per the standard detail. 6 inches of 3,500 psi concrete shall be provided all around the pipe.

Force Main Installation

Deliver materials to the Site to ensure uninterrupted progress of the work. Inspect delivered pipe for cracked, gouged, chipped, dented or other damaged material. If the pipe exhibits any of these characteristics immediately remove from site.

Handle all pipe, fittings, appurtenances and accessories carefully with approved handling devices. Do not drop or roll material off trucks. Do not otherwise drop, roll or slide piping. Unload pipe, fittings and specials as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign matter. Store pipes and fittings on heavy wood blocking or platforms so they are not in contact with the ground.

When distributing the pipe along the pipeline alignment, the pipe should be blocked to prevent any possibility of rolling. Pipe with bells and spigots should be supported along the barrel of the pipe to prevent deformation of the joining ends, to prevent dirt accumulating on the sealing surfaces and inside the pipe.

Perform trench excavation and backfill in accordance with the New Castle County Standard Specifications for Construction, Section 311004 "Excavation, Pipe Construction and Backfill for Pipe Trenches." No section of sewer pipe shall be laid before the subgrade or bedding has been reviewed by the Engineer. If an existing pipeline is to be removed and replaced by a new pipeline, the Contractor shall ensure temporary bypass pumping and all appurtenances required to maintain service is in place and ready for operation.

All concrete required to support and reinforce wye branches, tee wyes, bends, and fittings shall be placed as directed on the Contract Drawings.

Pipe jointing shall be as specified herein, and per manufacturer's recommendation for the pipe material used for this project. Bell and spigot and/or push-on joints and gaskets shall be thoroughly cleaned and lubricated in accordance with manufacturer's recommendations. The Contractor shall ensure that the pipe is sufficiently joined as to create a water tight seal.

Whenever a pipe requires cutting to fit into the line or to bring it to the required location, the work shall be done in a satisfactory manner so as to leave a smooth end without extra compensation.

The Contractor shall lay pipeline at the low end of a run and proceed upgrade unless otherwise specified or directed by the Engineer. Lay all pipe with bells (if present) pointing upstream. Lay all pipelines in trench excavations on bedding as specified, concrete cradle or other foundations as shown on the Contract Drawings or directed by the Engineer.

Carefully place each pipe and check for alignment and grade. Make adjustments to bring pipe to line and grade by scraping away or filling in bedding material under the body of the pipe. Wedging or blocking up the pipe barrel is not permitted.

Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home. Shape bell holes in the bedding material for each joint as required allowing the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length. Thoroughly tamp bell holes following the making of each joint.

As the work progresses, clean the interior of pipelines of all dirt and superfluous materials. Properly secure the pipe against movement and make the pipe joints in the excavation as required. Carefully grade and compact pipe bedding by hand around the pipe, ensuring pipe haunches are properly supported.

Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed and are not ready to connect.

Couplings and Joints Restraints shall be installed per manufacturers instructions

If performing an excavated point repair of a pressure sewer pipe, the Contractor shall execute his work in accordance with above, and the following:

The defective pipe shall be uncovered to the extent that competent pipe is found on either end of the defective pipe and inspected by the Contractor and the Engineer. An approximate location, length of repair and existing pipe material are depicted on the Contract Drawings.

The Contractor shall saw-cut the existing pipe where it's found to be competent, such that the ends of the pipe are straight, smooth and free of chips, cracks or any other defects.

The Contractor shall remove the defective pipe section from the trench, dispose of properly and recondition the bedding material as required in accordance with paragraph E above.

The Contractor shall place the repair pipe, which shall be of the same pipe diameter and material as the defective pipe unless otherwise specified or directed by the Engineer, and connect to the existing pipe using restrained pressure type pipe couplings. Secure the pipe couplings in accordance with the manufacturer's recommendations.

After an inspection by the Engineer, the Contractor shall backfill and restore the disturbed area as directed.

Sanitary Sewer Manholes

The Contractor shall take every precaution to prevent damage to the manhole sections and appurtenances during transportation and unloading. Unload manhole sections using skids, pipe hooks, rope slings, or suitable power equipment, if necessary, and keep the sections under control at all times. Do not allow the manhole sections to be dropped, dumped or dragged under any conditions.

Prior to being installed, each precast manhole or structure shall be carefully inspected. Reject those not meeting the specifications and replace at the Contractor's expense.

If any manhole section is damaged in the process of transportation or handling, the Contractor shall reject and immediately remove such sections from the site and replace the damaged manhole sections at his own expense.

Perform trench excavation and backfill in accordance with the Utility owner's specifications.

No manhole base section shall be placed before the subgrade or bedding has been reviewed by the Engineer.

If an existing manhole is to be removed and replaced by a new manhole, the Contractor shall ensure temporary bypass pumping and all appurtenances required to continue service is in place and ready for operation.

Unless otherwise specified, the Contractor shall cut and remove a portion of the existing pipe(s) in order to place the new manhole. The Contractor shall insert a pipe stub in the new manhole, place the manhole and align with the existing pipe. A pipe repair coupling as specified herein shall be used to join the existing pipe with the new pipe stub.

The Contractor shall place the manhole base section at the location, elevation and orientation depicted on the Drawings. The base section shall be level and plumb.

The Contractor shall connect all pipes utilizing the pre-cast openings and pipe to manhole gaskets. After proper placement of the manhole base section, the Contractor shall place subsequent sections.

Doghouse-type manholes shall be installed as specified on the Contract Drawings.

Install sufficient sealing compound so as to show a "squeeze-out" on the outside of the joint.

Apply trowelable grade butyl rubber backplaster material one-quarter (1/4) inch minimum thickness, when dry, on the outside of the manhole at each joint, extending six (6) inches above and below the joint. Apply butyl rubber backplaster on the outside of the chimney from three (3) inches below the bottom adjustment ring on the cone section to, and covering, the adjustment rings just below the casting. Next, apply shrink wrap or visquine to the outside of each joint to further seal manhole.

Set cones or flattops as determined by the depth of the manhole, so that no more than 12 inches of reinforced concrete adjusting rings are required to adjust the top of the manhole casting to grade.

Provide a soil-tight seal between the precast manhole and adjusting ring, and each adjoining adjusting ring, and between the adjusting ring and casting by the use of two (2) rows of 1/2 inch extrudable preformed gasket material or trowelable grade butyl rubber or an approved equal. After butyl rubber is applied to exterior of adjustment rings, install exterior chimney seal if specified.

Set manhole frame on 1/2 inch extrudable preformed gasket material or trowelable grade butyl rubber or an approved equal. In paved areas, match top of casting with finished grade; in unpaved/grassy areas, install casting so that the top extends at least six inches above finished grade, and grade surface to provide positive surface drainage away from manhole.

Locate manhole steps to one side of the manhole, not directly above the inlet or outlet pipes, granting access to the bench. Install steps with non-shrink mortar or epoxy grout.

The Contractor shall restore all manholes and associated surface areas to their original condition or as required by the Utility Owner and specified in the description of work. The newly installed pipe shall be restrained and sealed at the manhole in accordance with the manufacturers recommended procedures and with a material approved by the Utility Owner.

Restoration of the bottom of the Manhole shall be done as follows:

1. For restorations less than or equal to three inches grout shall be used. The grout design mix shall meet or exceed 500 psi (3,447 kPa) compressive strength at 28 days. The Contractor may, with the

approval of the Utility Owner, incorporate grout additives to improve flow properties, provided that the minimum compressive strength requirements are met.

2. For restorations greater than three inches concrete shall be used. Concrete shall be as specified in the Contract Documents.

Jack and Bore

The pipe, whether casing or carrier, installed by means of Tunneling shall be installed to the line and grade specified on the Contract Drawings. Initial control information will be established prior to the initiation of work. As Tunneling proceeds, line and grade will be furnished on a scaled drawing at intervals not exceeding twenty (20) feet by the Contractor. The Contractor shall use this information to project the alignment ahead until subsequent references can be set.

If a pilot hole is to be tunneled, the pilot hole shall not deviate greater than 5% of depth over the length of the tunnel unless previously agreed to by the Engineer. In the event that the pilot hole does deviate greater than required, the Engineer may require the Contractor to pull back and re-tunnel from the location along the path prior to deviation.

Bore so as not to interfere with, interrupt, or endanger surface and activity thereon. Minimize subsidence of surface, structures, and utilities above and in vicinity of bore. Support ground continuously to prevent loss of ground and keep perimeters stable. Be responsible for settlement resulting from operations. Repair and restore damaged property to its original condition before being disturbed at no cost to the OWNER.

The approach and receiving trenches shall be excavated, and the pipe placed at the elevation and grades specified, in accordance with the Drawings and Contract Documents. Boring shall be performed in the downstream direction.

Boring shall be installed to grade and line indicated on the contract documents. Jack and bore operation shall be monitored via censoring devices to ensure correct grade and line installation. There shall be a 1-inch tolerance for grade elevations of the casing and carrier pipes.

The casing pipe shall be pushed in to the ground with a boring auger rotating within the pipe to remove the spoil. The cutting head shall not be advanced ahead of the casing pipe except for that distance necessary to permit the cutting teeth to cut clearance the pipe.

The overcut of cutting head shall not exceed more than ½ inch. If unstable soil is encountered during the boring procedure, the cutting head shall be retracted into the casing to maintain a balance between the pushing pressure and the ratio of pipe advancement to quality of soil. The Contractor shall use a steering system to ensure grade is met, on a single pass. Pilot tube guided boring is not acceptable.

If voids should develop greater than the outside diameter of the pipe by approximately one (1) inch, the Contractor shall fill the voids with approved pressurized grout material.

When augers and cutting heads or similar devices are used for advancing the casing pipe, the front of the pipe shall be provided with mechanical arrangements or devices that will prevent the auger and cutting head from leading the pipe (so that there will be no unsupported excavation ahead of the pipe). The auger and cutting head arrangement shall be removable from the pipe in the event an obstruction is encountered.

The operation shall be continuous until the casing is installed.

Direction of jack and bore shall be monitored via sensing devices to ensure correct grade and line installation. A thrust wall shall be constructed normal to the proposed line thrust. The thrust load shall be imparted to the pipe through a suitable thrust ring that is sufficiently rigid to ensure distribution of the thrust load on the pipe. The thrust wall and jacking system shall be designed to carry the thrust of the jacks to the soil without excessive soil deflection and in such a manner as to avoid any disturbance of adjacent structures or utilities.

Dewatering shall be performed by the Contractor in compliance with all applicable local, State and Federal rules, regulations and ordinances. Surface drainage shall be diverted away from the execution through the use of dikes, ditches, pipes, sumps, or other means. When water is encountered, develop and maintain dewatering system of sufficient capacity to remove water continuously, keeping excavations free of water until backfill operation is in progress.

Keep removal of soil to a minimum. Dewater in accordance to Contract Documents. Observe settlement or displacement of surface facilities due to dewatering. Should settlement or displacement be detected, notify Engineer immediately and act to maintain safe conditions and prevent damage.

Carrier pipe shall be installed in the casing pipe with restrained joints, and as illustrated on the Contract Drawings. The carrier shall be supported within the casing so that no external loads are transmitted to the carrier pipe. The ends of the casing pipe shall be sealed to provide a barrier against debris and seepage.

After carrier pipe and spacers are installed, the annular space shall be filled with grout.

Bypass Pumping

The Contractor shall remove manhole sections or make connections to the existing sewer and construct temporary bypass pumping structures as may be required to provide adequate suction conduit.

Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of work, it is to be removed in a manner that permits the flow of sewage to slowly return to normal without surge to prevent surcharging or causing other major disturbances downstream.

When working inside manhole or sewer line, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.

The Contractor shall obtain all rights and permits prior to the installation of the bypass pipelines if such lines are outside the Limit of Disturbance. When the bypass pipeline crosses local streets and private driveways, the Contractor must place the bypass pipelines in trenches and cover with plating or temporary pavement. Upon completion of the bypass pumping operations, and after the receipt of written permission from the County or their representative, the Contractor shall remove all the piping, restore all property to previously existing condition and restore all pavement. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline within public ways from the agency with jurisdiction.

Construction Requirements:

The Contractor is solely responsible for bypass pumping quality assurance during the length of the project. The contractor is responsible for any costs associated with corrective measures required to replace or repair items not meeting the quality standards specified by the Utility Owner or Engineer.

Submittals

The Contractor shall submit the following items for review and approval by the Utility Owner or Engineer in accordance with the Contract Documents. Approval of the submittals by the Utility Owner or Engineer shall be obtained prior to ordering pipe materials and/or the start of the pipe replacement process.

1. Detailed construction procedures, and layout plans to include sequence of construction.
2. Sewer bypass plans, methods and list of equipment to be utilized.
3. Description of the method to remove and dispose of the host pipe, if required.
4. The safety plan in conformance with the Contract Documents and OSHA regulations.
5. Traffic control plans.
6. Project schedule.
7. Pipe appearances, including gaskets, clamps, shear rings, couplings, and plugs. Include evidence of compliance with ASTM standards
8. Piping, including certified test results from the manufacturer demonstrating compliance with the requirements.
9. Detailed drawings and data on pipe, fittings, joints, gaskets and appurtenance. Include certified test results from the manufacturer demonstrating compliance with the requirements.
10. Certified test results from the manufacturer demonstrating compliance with the requirements of this section.
11. Pipe layouts and schedules.
12. Precast manholes and structures including evidence of compliance with ASTM standards, and a table or chart showing the specific sections and orientation of penetrations for each manhole supplied.

13. Manhole appurtenances, including but not limited to O-ring gasket and joint sealant, resilient connector, manhole frame and cover, and manhole step.
14. Provide manufacturer's written confirmation that all reinforced pre-cast concrete manhole sections contain an inorganic copolymer waterproofing admixture in compliance with manufacturer's application instructions.
15. Sewer Lateral Cleanouts
16. Shop drawings for casing pipe showing size and hold down assemblies or casing spacers for carrier pipe.
17. Working drawings, shop drawings (drawn to scale), catalog cut sheets, technical data, and written procedures describing in detail proposed bore and jack method and entire operation to be used, for information only, including but not limited to:
18. Provide a construction schedule for approval that includes the sequence of installation of the casings and pipelines. Provide a laying schedule (on the Drawings) that shows necessary deviations from the Drawings due to specific utility conflicts discovered during required exploratory excavations. Include a description of the proposed construction methods, including methods to establish and maintain vertical and horizontal alignment.
19. Working and receiving shafts.
20. Dewatering Plan.
21. Method of removing soils and installation of casing and carrier pipe.
22. Size, capacity, and arrangement of equipment.
23. Pipe closure system.
24. Certified Welders Certificate.
25. Backstop.
26. Shaft base material.
27. Type of cutter head.
28. Method of monitoring and controlling the line and grade.
29. Detection of surface movement.
30. Procedure for installing pipe supports, anchor, or placement of grout between carrier pipe and casing pipe.
31. Bulkhead details and proposed positive method of anchoring carrier pipe to prevent floatation.
32. Catalog data for casing spacers when used for temporary support during construction.
33. Procedure for monitoring line and grade.
34. Certification shall be in the form of a letter or company-standard form containing all required data and signed by an officer of the manufacturing, fabricating, or supply company.

Other Utilities:

The Utility Owner or as shown on the drawings shall provide the Contractor with available information relating to the location of utilities adjacent to the pipe to be replaced. The Contractor shall, prior to starting work, verify the location of all adjacent utilities. The minimum clearance from other utilities shall be approximately 18-inches. The Utility Owner may at its discretion reduce the minimum clearance.

The Contractor shall expose all interfering and crossing utilities by spot excavating at the planar intersection of the pipe and removing the soil from around the utility. The cost of exposing these utilities shall be borne by the Contractor.

Emergency Repairs to Damaged Utilities:

Known or Field Located Utilities - In the event that the Contractor or his Subcontractor during the execution of the work breaks any known or field located pressure or gravity main causing the disruption of service and/or an eminent hazard, it shall be the responsibility of the Contractor/Subcontractor to immediately notify the Utility Owner at the designated emergency telephone number and immediately undertake measure to repair the damaged utility. To that effect, the Contractor/Subcontractor shall ascertain prior to initiating the work that the necessary repair parts, tools, equipment, and labor are on ready and available onsite to complete the repair work without delays. The Utility Owner personnel and Engineer shall witness the repair work.

If the Contractor/Subcontractor estimates or determines that he is not going to be able to restore service within a less than two-hour period, the Contractor shall immediately contact the Utility Owner's manager to initiate repair.

The Utility Owner will undertake the repair work and will back charge the Contractor. The Utility Owner will submit an itemized bill within 30 calendar days from the occurrence of the event.

Unknown or Inaccurately Located Utilities - If the utility was not field located or it was inaccurately located in accordance with the prescribed procedures under the One-Call guidelines and the Contractor/Subcontractor cause a line break during the execution of the work, the same notification procedure as above must be followed. The Utility Owner will undertake the repair work at no cost to the Contractor.

Acceptance Testing

After the existing pipe is completely replaced the Contractor and Utility Owner shall perform inspections of the pipe. The newly installed pipe shall be visibly free of defects, which may affect the integrity or strength of the pipe. If in the opinion of the Utility Owner such defects exist, the pipe shall be repaired or replaced at the Contractor's expense.

Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness shall not be used and must be removed from the site.

Cooperate and furnish all assistance necessary to perform the tests as specified herein and as further required and directed by the Engineer and the representative of the Owner. Furnish all Equipment and personnel to conduct the tests specified herein and/or any proposed by the Owner of the utility.

The Contractor shall not make connections to existing sanitary sewers until after the final inspection and all tests have been accepted.

Leakage Tests for Sewer Pipes

Low-Pressure Air Test - Gravity Sewer

1. All sewer pipes above the groundwater line with a diameter of 39 inches or less, or as directed by the Engineer, will be tested by the "Low-Pressure Air Test."
2. This test will be made by plugging all branch fittings and ends of lateral stubs to withstand internal pressure. The section of line being tested shall also be securely plugged at each manhole. All stoppers shall be adequately braced when required.
3. Air shall slowly supplied to the plugged pipe line until the internal air pressure reaches 4.0 pounds per square inch (PSI) greater than the average back pressure of any groundwater that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.
4. The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 PSI. The line shall be considered acceptable if the amount of time is not less than the following formula:

$$T = 0.0850DK/Q, \text{ where}$$

K = 0.000419DL, but not less than 1.0

Q = rate of loss of 0.003 CFM per square foot of internal surface

D = Pipe diameter, inches

L = Length of pipe being tested, feet

Minimum Holding Time Required For Pressure To Drop From 3.5 To 2.5 Psig For Size And Length Of Pipe Indicated For Q = 0.003

Pipe Diameter (inches)	Minimum Time (min:sec)	Length for Min. Time (feet)	Time for Longer Length (seconds)	Specific Time for Length							
				100 feet	150 feet	200 feet	250 feet	300 feet	350 feet	400 feet	450 feet
4	1:53	597	0.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42

Leakage Test for Manholes and Structures

Manholes, vaults and similar structures constructed may be tested by the Vacuum Test. This test shall be performed in accordance with ASTM C 1244. Testing prior to backfilling is highly recommended to facilitate corrective measures in case of test failure.

1. The Contractor shall plug all pipe openings, taking care to securely brace the plugs and inflate the compression band to 40 psi to bring about a seal between the vacuum tester base and the manhole frame.
2. A vacuum to 10 inches of mercury (10" Hg) shall be drawn and the valve closed.
3. Manholes and similar structures shall be considered acceptable if the vacuum remains at 10" Hg or drops to 9" Hg in a time greater than 1 minute.

Manhole Rehabilitation Acceptance

A visual inspection of all manhole repairs and rehabilitation shall be performed by the Engineer. The Contractor shall provide labor and materials required for inspection. There shall be no signs of infiltration, spalling, loss of adhesion, cracks or any other defects in the Contractor's work.

Acceptance is also dependent satisfactory results of field compressive strength testing, if performed.

All manholes that have been rehabilitated shall be re-inspected prior to Final Acceptance, but no less than 12 weeks after Conditional Acceptance. The Engineer shall schedule this reinspection with the Contractor, providing a minimum of 2 weeks' notice. Re-inspection shall include a visual confirmation that no infiltration, spalling, loss of adhesion, cracks or any other defects have formed in the work performed since Conditional Acceptance. Any defects found shall be corrected by the Contractor in accordance with the manufacturer's recommendation at no additional cost to the County.

Re-inspection shall include at least 20% of the manholes rehabilitated. The Engineer will select the manholes to be re-inspected, the Contractor shall provide all labor and materials required for re-inspection, including traffic control.

If more than 10% of the manholes re-inspected fail a visual inspection, an additional 20% of the manholes rehabilitated shall be re-inspected. If more than 10% of the second group of manholes re-inspected fail, all manholes rehabilitated shall be re-inspected.

The Contractor shall pay the Engineer's expense in addition to all other expenses, for re-inspection of manholes rehabilitated beyond the first 20%. The Engineer's expense shall be the same dollar amount as the liquidated damages identified in the Contract Documents.

Other Acceptance Testing

The Engineer reserves the right to perform other testing as they deem necessary, depending on several factors, including but not limited to failed acceptance tests, site and weather conditions, post-construction CCTV inspection and observances during construction. These tests may include the following:

Pipe Alignment Test (Lamp Test): Pipe alignment testing consists of visually examining the inside of the pipe between two consecutive manholes with the aid of a light and mirror. A mirror is held at the invert of the pipe and adjusted so the light and barrel of pipe can be seen. The barrel of the pipe shall have no vertical or horizontal deflection.

Ovality/Deflection Test (Mandrel Test): Ovality/Deflection testing consists of pulling a mandrel, appropriately sized for the pipe diameter(s) constructed, through the constructed pipe sections. The size of the mandrel shall be based on the ovality/deflection requirements specified within the Contract. The mandrel shall pass through all pipe segments without meeting resistance.

Failed Acceptance Test

If any test results indicate the presence of a defect, whether caused by defective materials, improper workmanship or damage to the materials, the Contractor shall, locate and repair the defect at his own expense. The means and methods of repair shall be discussed with the Engineer prior to execution.

If defective portions cannot be located, remove and reconstruct as much of the original work as necessary to obtain piping that meets the leakage requirements specified herein and retest, all at no addition to the Contract Price.

The failed test shall be re-performed until the results are within acceptable limits.

CCTV Inspections

The Contractor shall perform post installation internal television inspections of the installed sanitary main. Each reach of sewer shall have audio description with appropriate stationing of services indicated. The data and stationing are to be on the video. All such inspections shall be performed by personnel trained in locating breaks, obstacles and service connections by closed circuit color television.

Post construction video tapes are to be submitted to the Engineer and Utility Owner for review prior to final payment. Should any portion of the inspection tapes be of inadequate quality or coverage, as determined by the Utility Owner, the Contractor will have that portion video-taped at no additional expense to the State or Utility Owner. All original video tapes remain property of the Utility Owner. The Contractor may, at the discretion of the Utility Owner retain second copy.

Do not make connections to existing sanitary sewers until after the final inspection and tests have been approved. Furnish all Material and labor required for tests, including caps and plugs and the cost thereof included in the prices bid for installing sanitary pipe. Furnish water required for leakage test at no additional cost to the Department.

Method of Measurement and Basis of Payment:

Price and payment for sanitary sewer system shall be lump sum under item 711501.

Item 711501 includes furnishing, transporting, and installing the Materials; testing of the sanitary sewer system; including manholes; connecting to existing sanitary sewer systems and services; maintaining service as required; installation of force main and thrust restraints, excavating; disposing of excess excavated Material; backfilling, including Type C borrow required specifically for filling the sewer trench; furnishing Material for backfilling; furnishing and placing warning tape; aggregate pipe bedding, sheeting and shoring, temporary support of existing Utilities, dewatering, furnishing and using tanker trucks for excess flow, constructing and operating a bypass pumping system, temporary bypass pumping and hauling, disposing of excess flow at an approved location; cutting and capping new or existing lines and for all labor, Equipment, tools and necessary incidentals to achieve and accept an operational sanitary sewer system.

Abandonment of all manholes and sewer shall be paid for under Section 211.

All lump sum pay items will be prorated for each pay estimate. A percentage of the lump sum item will be paid, on a monthly basis, based upon the amount of work completed and accepted by the Engineer.

3/27/2019

727506 - RELOCATING FENCE

Description:

This work consists of relocating the existing concrete barrier and replacing the metal fence, hardware, and accessories of the type and height at locations shown on the Plans and in accordance with these Special Provisions, notes on the Plans, and as directed by the Engineer.

Materials and Construction Methods:

All existing concrete barriers shall be salvaged and reused. Any material which cannot be salvaged, shall be replaced with similar material or approved equal after obtaining approval from the Engineer. Concrete, if required for setting the posts, shall conform to Section 1022 - Portland Cement Concrete, Class B.

The Contractor shall notify the Engineer and the owner at least fourteen days in advance prior to removal of the fence, unless specified otherwise on the Plan or by the Engineer. Remove and dispose the existing metal fence, posts, hardware, and accessories at locations on the Plan or as directed by the Engineer. Install new metal fence, posts, hardware, and accessories.

Spacing and setting of the posts, railing and/or fence panel, shall conform to the existing conditions. All paved or grassed areas disturbed shall be restored to the original conditions at the Contractor's expense.

Method of Measurement:

The quantity of relocated fence will be measured as the actual number of linear feet of concrete barrier relocation and replacement of fence, posts, hardware and accessories and accepted measured along the fence.

Basis of Payment:

The quantity of relocated fence will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for relocating the concrete barrier, removing and replacing the fence, for furnishing and installing required new fence, posts, hardware, and accessories, concrete if required, excavation and backfilling, disposing of the discarded materials, for all labor, tools, equipment, and incidentals necessary to complete the item.

2/4/2019

763501 - CONSTRUCTION ENGINEERING

Description:

This work consists of construction lay out including; stakes, lines and grades as specified below. Subsection 105.10 Construction Stakes, Lines and Grades of the Standard Specifications is voided.

Based on contract plans and information provided by the Engineer, the Contractor shall stake out right-of-way and easements lines, limits of construction and wetlands, slopes, profile grades, drainage system, centerline or offset lines, benchmarks, structure working points and any additional points to complete the project.

The Engineer will only establish the following:

- (a) Original and final cross-sections for borrow pits.
- (b) Final cross-sections: Top and bottom pay limit elevations for all excavation bid items that are not field measured by Construction inspection personnel. The Contractor shall notify the Engineer when these pay limit elevations are ready and allow for a minimum of two calendar days for the Engineer to obtain the information.
- (c) Line and grade for extra work added on to the project plans.

Equipment. The Contractor shall use adequate equipment/instruments in a good working order. He/she shall provide written certification that the equipment/instrument has been calibrated and is within manufacturer's tolerance. The certification shall be dated a maximum of 9 months before the start of construction. The Contractor shall renew the certification a minimum of every 9 months. The equipment/instrument shall have a minimum measuring accuracy of [3mm+2ppmxD] and an angle accuracy of up to 2.0 arc seconds or 0.6 milligons. If the Contractor chooses to use GPS technology in construction stakeout, the Contractor shall provide the Engineer with a GPS rover and Automatic Level for the duration of the contract. The GPS rover shall be in good working condition and of similar make and model used by the Contractor. The Contractor shall provide up to 8 hours of formal training on the Contractor's GPS system to a maximum of four Engineer's appointees (DELDOT Construction Inspectors). At the end of the contract, the Engineer will return the GPS rover to the Contractor. If any of the equipment/instruments are found to be out of adjustment or inadequate to perform its function, such instrument or equipment shall be immediately replaced by the Contractor to the satisfaction of the Engineer. Choosing to use GPS technology does not give the contractor authority to use machine control.- Construction Engineering (GPS) Machine Control Grading shall only be used if noted in the General Notes in the plan set outlining the available files that will be provided to the Contractor and "the Release for delivery of documents in electronic form to a contractor" are signed by all parties prior to delivery of any electronic files. Only files designated in the General Notes shall be provided to the contractor. If machine control grading is allowed on the project see the "machine control" section of this specification. GPS technology and machine control technology shall not be used in the construction of bridges.

Engineering/Survey Staff. The Contractor shall provide and have available for the project an adequate engineering staff that is competent and experienced to set lines and grades needed to construct the project. The engineering personnel required to perform the work outlined herein shall have experience and ability compatible with the magnitude and scope of the project. Additionally, the Contractor shall employ an engineer or surveyor licensed in the State of Delaware to be responsible for the quality and accuracy of the work done by the engineering staff. When individuals or firms other than the Contractor perform any professional services under this item, that work shall not be subject to the sub contracting requirements of Subsection 108.01 of the Standard Specifications. The Contractor shall assume full responsibility for any errors and/or omissions in the work of the engineering staff described herein. If construction errors are caused due to erroneous work done under Construction Engineering the Contractor accepts full responsibility, no matter when the error is discovered. Consideration will not be given for any extension of contract time or additional compensation due to delays, corrective work, or additional work that may result from faulty and erroneous construction stakeout, surveying, and engineering required by this specification.

Construction Methods:

Performance Requirements:

- (a) Construction Engineering shall include establishing the survey points and survey centerlines; finding, referencing, offsetting the project control points; running a horizontal and vertical circuit to verify the precision of given control points. Establishing plan coordinates and elevation marks for culverts, slopes, subbase, subsurface drains, paving, subgrade, retaining walls, and any other stakes required for control lines and grades; and setting vertical control elevations, such as footings, caps, bridge seats and deck screed. The Contractor shall be responsible for the preservation of the Department's project control points and benchmarks. The Contractor shall establish and preserve any temporary control points (traverse points or benchmarks) needed for construction. Any project control points (traverse points) or benchmarks conflicting with construction of the project shall be relocated by the Contractor. The Contractor as directed by the Engineer must replace any or all stakes that are destroyed at any time during the life of the contract. The Contractor shall re-establish centerline points and stationing prior to final cross-sections by the Engineer. The Vertical Control error of closure shall not exceed 0.035 ft times. The Horizontal Control precision ratio shall have a minimum precision of 1:20,000 feet of distance traversed prior to adjustment.
- (b) The Contractor shall perform construction centerline layout of all roadways, ramps and connections, etc. from project control points set by the Engineer. The Contractor using the profiles and typical sections provided in the plans shall calculate proposed grades at the edge of pavement or verify information shown on Grades and Geometric sheets.
- (c) The Contractor shall advise the Engineer of any horizontal or vertical alignment revisions needed to establish smooth transitions to existing facilities. The Contractor must immediately bring to the attention of the Engineer any potential drainage problem within the project limits. The Engineer must approve any proposed variation in profile, width or cross slope.
- (d) The Contractor shall establish the working points, centerlines of bearings on bridge abutments and on piers, mark the location of anchor bolts to be installed, check the elevation of bearing surfaces before and after they are ground and set anchor bolts at their exact elevation and alignment as per Contract Plans. Before completion of the fabrication of beams for bridge superstructures, the Contractor shall verify by accurate field measurements the locations both vertically and horizontally of all bearings and shall assume full responsibility for fabricated beams fitting and bearing as constructed. After beam erection and concurrently with the Department project surveyors or their designated representative, the Contractor shall survey top of beam elevations at a maximum of 10-ft stations and compute screed grades. These shall be submitted to the Engineer for review and approval before the stay in place forms are set. Construction stakes and other reference control marks shall be set at sufficiently frequent intervals to assure that all components of the structure are constructed in accordance with the lines and grades shown on the plans. The Contractor will be responsible for all structure alignment control, grade control and all necessary calculations to establish and set these controls.
- (e) The Contractor, using contract plans, shall investigate proposed construction for possible conflicts with existing and proposed utilities. The Contractor shall then report such conflicts to the Engineer for resolution. All stakes for utility relocations, which will be performed by others, after the Notice to Proceed has been given to the Contractor, shall be paid for under item 763597
- Utility Construction Engineering.
- (f) The Contractor shall be responsible for the staking of all sidewalk and curb ramp grades in accordance with the plans and the Departments Standard Construction Details. The Contractor shall review the stakeout with the Engineer prior to construction. The Engineer must approve any deviation from plans, Department Standard Construction Details and Specifications in writing. The Contractor shall be responsible for any corrective actions resulting from problems created by adjustments if they fail to obtain such approval.
- (g) If wetland areas are involved and specifically defined on the Plans the following shall apply:
 - i. It is the intent of these provisions to alert the Contractor, that he/she shall not damage or destroy wetland areas, which exist beyond the construction limits. These provisions will be strictly enforced

- and the Contractor shall advise his/her personnel and those of any Subcontractor of the importance of these provisions.
- ii. All clearing operations and delineation of wetlands areas shall be performed in accordance with these Special Provisions. Before any clearing operation commences the Contractor shall demarcate wetlands at the Limits of Construction throughout the entire project as shown on the Plans labeled as Limits of Construction or Wetland Delineation to the satisfaction of the Engineer.
 - iii. The material to be used for flagging the limits of construction shall be orange vinyl material with the wording "Wetland Boundary" printed thereon. In wooded areas, the flagging shall be tied on the trees, at approximate 20-foot intervals through wetland areas. In open field and yard areas that have been identified as wetlands, 6 foot posts shall be driven into the ground at approximate 50-foot intervals and tied with the flagging. The flagging shall extend approximately 12 inches in length beyond the post. Posts shall be oak with cross sectional dimensions of 1 ½ inches to 2 inches by 1 ½ inches to 2 inches or ¼ inch rebar.
 - iv. If the flagging has been destroyed and the Engineer determines that its use is still required, the Contractor shall reflag the area at no cost to the Department. If the Contractor, after notification by the Engineer that replacement flagging is needed, does not replace the destroyed flagging within 48 hours, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Contractor will be charged to the Contractor and deducted from any monies due under the Contract.
 - v. At the completion of construction, the Contractor shall remove all posts and flagging.
 - vi. The Contractor shall be responsible for any damages to wetlands located beyond the construction limits, which occurs from his/her operations during the life of the Contract. The Contractor shall restore all temporarily disturbed wetland areas to their preconstruction conditions. This includes restoring bank elevations, streambed and wetland surface contours and wetlands vegetation disturbed or destroyed. The expense for this restoration shall be borne solely by the Contractor.
- (h) Whenever the Engineer will be recording data for establishment of pay limits, the Contractor will be invited to obtain the data jointly with the Engineer's Survey Crew(s) in order to agree with the information. If the Contractor's representative is not able to obtain the same data, then the information obtained by the Engineer shall be considered the information to be used in computing the quantities in question.

Submittals. All computations necessary to establish the exact position of all work from the control points shall be made and preserved by the Contractor. All computations, survey notes, electronic files, and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at any time as directed by the Engineer. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be made as soon as possible. The Contractor shall furnish the Engineer with such assistance as may be required for checking all lines, grades, and measurements established by the Contractor and necessary for the execution of the work. Such checking by the Engineer shall not relieve the Contractor of his/her responsibility for the accuracy or completeness of the work. Copies of all notes must be furnished to the engineer at the completion of the project.

The Contractor shall submit any of the following at the Engineer's request:

- (a) Proposed method of recording information in field books to ensure clarity and adequacy.
- (b) A printout of horizontal control verification, as well as coordinates, differences and error of closure for all reestablished or temporary Control Points.
- (c) A printout of vertical control verification, with benchmark location elevation and differences from plan elevation.
- (d) Sketch of location of newly referenced horizontal control, with text printout of coordinates, method of reference and field notes associated with referencing control - traverse closure report.
- (e) Description of newly established benchmarks with location, elevation and closed loop survey field notes - bench closure report
- (f) All updated electronic and manuscript survey records.
- (g) Stakeout plan for each structure and culvert.
- (h) Computations for buildups over beams, screed grades and overhang form elevations.
- (i) A report showing differences between supplied baseline coordinates and field obtained coordinates, including a list of preliminary input data.
- (j) Any proposed plan alteration to rectify a construction stakeout error, including design calculations, narrative and sealed drawings.

- (k) Baseline for each borrows pit location.
- (l) Detailed sketch of proposed overhead ground mounted signs or signals showing obstructions that may interfere with their installation.
- (m) Copies of cut sheets.

Machine Control Grading

This Section of the specification shall only be used if machine control is authorized for use on the project.

Description:

This specification contains the requirements for grading operations utilizing Global Positioning Systems (GPS).

Use of this procedure and equipment is intended for grading the subgrade surface; it is not intended for the use in constructing final surface grades.

The Contractor may use any manufacturer's GPS machine control equipment and system that results in achieving the grading requirements outlined in section 202 of the standard specifications. The Contractor shall convert the electronic data provided by the Department into the format required by their system. The Department will only provide the information outlined in this document and no additional electronic data will be provided.

The Contractor shall perform at least one 500 foot test section with the selected GPS system to demonstrate that the Contractor has the capabilities, knowledge, equipment, and experience to properly operate the system and meet acceptable tolerances. The engineer will evaluate and make the determination as to whether additional 500 foot test sections are required. If the Contractor fails to demonstrate this ability to the satisfaction of the Department, the Contractor shall construct the project using conventional surveying and staking methods.

Materials:

All equipment required to perform GPS machine control grading, including equipment needed by DelDOT to verify the work, shall be provided by the Contractor and shall be able to generate end results that are in accordance with the requirements of Division 200 - EARTHWORK of the Standard Specifications.

Construction:

A. DelDOT Responsibilities:

1. The Department will set initial vertical and horizontal control points in the field for the project as indicated in the contract documents, (plans set). If the Contractor needs to establish new control points they shall be traversed from existing control points and verified to be accurate by conventional surveying techniques.
2. The Department will provide the project specific localized coordinate system.
3. The Department will provide data in an electronic format to the Contractor as indicated in the General Notes.
 - a. The information provided shall not be considered a representation of actual conditions to be encountered during construction. Furnishing this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered including, but not limited to site visits, and basing the bid on information obtained from these investigations, and the professional interpretations and judgments of the Contractor. The Contractor shall assume the risk of error if the information is used for any purpose for which the information is not intended.
 - b. Any assumption the Contractor makes from this electronic information shall be at their risk. If the Contractor chooses to develop their own digital terrain model the Contractor shall be fully responsible for all cost, liability, accuracy and delays.

- c. The Department will develop and provide electronic data to the Contractor for their use as part of the contract documents in a format as indicated in the General

Notes. The Contractor shall independently ensure that the electronic data will function in their machine control grading system.

4. The Files that are provided were originally created with the computer software applications MicroStation (CADD software) and INROADS (civil engineering software). The data files will be provided in the native formats and other software formats described below. The contractor shall perform necessary conversion of the files for their selected grade control equipment. The Department will furnish the Contractor with the following electronic files:
 - a. CAD files
 - i. Inroads -Existing digital terrain model (.DTM)
 - ii. Inroads -Proposed digital terrain model (.DTM)
 - iii. Microstation -Proposed surface elements - triangles
 - b. Alignment Data Files:
 - i. ASCII Format
5. The Engineer shall perform spot checks of the Contractor's machine control grading results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines that the work is not being performed in a manner that will assure accurate results, the Engineer may order the Contractor to redo such work to the requirements of the contract documents, and in addition, may require the Contractor to use conventional surveying and staking, both at no additional cost to the Department.

B. Contractor's Responsibilities

1. The Contractor shall provide the Engineer with a GPS rover and Automatic Level, for use during the duration of the contract. At the end of the contract, the GPS rover and Automatic Level will be returned to the Contractor. The Contractor shall provide a total of 8 hours of formal training on the Contractor's GPS machine control system to the Engineer and up to three additional Department appointees per rover.
2. The Contractor shall review and apply the data provided by the Department to perform GPS machine control grading.
3. The Contractor shall bear all costs, including but not limited to the cost of actual reconstruction of work, that may be incurred due to application of GPS machine control grading techniques. Grade elevation errors and associated corrections including quantity adjustments resulting from the contractor's use of GPS machine control shall be at no cost to the Department.
4. The Contractor shall convert the electronic data provided by the Department into a format compatible with their system.
5. The Contractor's manipulation of the electronic data provided by the Department shall be performed at their own risk.
6. The Contractor shall check and if necessary, recalibrate their GPS machine control system at the beginning of each workday in accordance with the manufacturer's recommendations, or more frequently as needed to meet the requirements of the project.
7. The Contractor shall meet the accuracy requirements as detailed in the Standard Specifications.
8. The Contractor shall establish secondary control points at appropriate intervals and at locations along the length of the project. These points shall be outside the project limits and/or where work is performed. These points shall be at intervals not to exceed 1000 feet. The horizontal position of these points shall be determined by conventional survey traverse and adjustments from the original

baseline control points. The conventional traverse shall meet or exceed the Department's Standards. The elevation of these control points shall be established using differential leveling from the project benchmarks, forming a closed loop. A copy of all new control point information including closure report shall be provided and approved by the Engineer prior to construction activities. The Contractor shall be responsible for all errors resulting from their efforts and shall correct deficiencies to the satisfaction of the Engineer and at no additional cost to the Department.

9. The Contractor shall provide stakes at all alignment control points, at every 500 foot stationing, and where required for coordination activities involving environmental agencies and utility companies at the Contractor's expense. Work that is done solely for utility companies and that is beyond the work performed under item 763501 - Construction shall follow and be paid for under item 763597 -Utility Construction Engineering.
10. The Contractor shall at a minimum set hubs at the top of finished grade at all hinge points on the cross section at 500 foot intervals on the main line and at least 4 cross sections on side roads and ramps as directed by the engineer or as shown on the plans. Placement of a minimum of 4 control points outside the limits of disturbance for the excavation of borrow pits, Stormwater Management Ponds, wetland mitigation sites etc. These control points shall be established using conventional survey methods for use by the Engineer to check the accuracy of the construction.
11. The Contractor shall preserve all reference points and monuments that are identified and established by the Engineer for the project. If the Contractor fails to preserve these items the Contractor shall reestablish them at no additional cost to the Department.
12. The Contractor shall provide control points and conventional grades stakes at critical points such as, but not limited to, PC's, PT's, superelevation points, and other critical points required for the construction of drainage and roadway structures.
13. No less than 2 weeks before the scheduled preconstruction meeting, the Contractor shall submit to the Engineer for review a written machine control grading work plan which shall include the equipment type, control software manufacturer and version, and proposed location of the local GPS base station used for broadcasting differential correction data to rover units.
14. The Contractor shall follow the guidelines set forth in the "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques" and follow a minimum of Second Order Class 1, (2-1) classification standards.

Automated equipment operations have a high reliance on accurate control networks from which to take measurements, establish positions, and verify locations and features. Therefore, a strong contract control network in the field which is the same or is strongly integrated with the project control used during the design of the contract is essential to the successful use of this technology with the proposed Digital Terrain Model (DTM). Consistent and well designed site calibration for all machine control operations (as described below under Contract Control Plan) are required to ensure the quality of the contract deliverables. The Contract Control Plan is intended to document which horizontal and vertical control will be held for these operations. Continued incorporation of the Base Station(s) as identified in the Contract Control Plan is essential to maintaining the integrity of positional locations and elevations of features. The Contract Control Plan shall be submitted to the Department for review and approval by the Departments Survey Section 3 weeks prior to the start of any machine control work. The Contractor shall operate and maintain all elements of the Machine Grade Control continuously once the operations begin until otherwise approved by the Engineer.

Contract Control Plan:

The Contractor shall develop and submit a Contract Control Plan for all contracts which use Machine Control Grading. Contract control includes all primary and secondary horizontal and vertical control which will be used for the construction contract. Upon the Contractor's completion of the initial survey reconnaissance and control verification, but prior to beginning primary field operations, the Contractor shall submit a Contract Control Plan document (signed and sealed by the Delaware licensed Land Surveyor or Delaware Professional Engineer who oversees its preparation) for acceptance by the Engineer, which shall include the following:

1. A control network diagram of all existing horizontal and vertical control recovered in the field as contract control.
2. Include a summary of the calculated closures of the existing control network, and which control has been determined to have been disturbed or out of tolerance from its original positioning.
3. An explanation of which horizontal and vertical control points will be held for construction purposes. If necessary include all adjustments which may have been made to achieve required closures.
4. An explanation of what horizontal and vertical control (including base stations) was set to accomplish the required stakeout or automated machine operation. Include how the position of these new control points was determined.
5. Describe the proposed method and technique (technology and quality control) for utilizing the control to establish the existing and/or proposed feature location and to verify the completed feature location and/or measured quantity.
6. A listing of the horizontal and vertical datums to be used and the combined factor to be used to account for ellipsoidal reduction factor and grid scale factor.
7. If the Contractor chooses to use machine control as a method of measuring and controlling excavation, fill, material placement or grading operations as a method of measuring and controlling excavation, fill, material placement or grading operations, the Contractor Control Plan shall include the method by which the automated machine guidance system will initially be site calibrated to both the horizontal and vertical contract control, and shall describe the method and frequency of the calibration to ensure consistent positional results.
8. Issues with equipment including inconsistent satellite reception of signals to operate the GPS machine control system will not result in adjustment to the "Basis of Payment" for any construction items or be justification for granting contract time extension.

Method of Measurement:

The quantity of Construction Engineering will not be measured.

Basis of Payment:

Payment will be made at the Lump Sum price bid for the item "Construction Engineering". The price bid shall include the cost of furnishing all labor, equipment, instruments, stakes and other material necessary to satisfactorily complete the work as herein described under this item for all roads and structures that are a part of the contract. Adjustment in payment will be made for the deletion or addition of work not shown in the contract documents.

Monthly payment will be made under this item in proportion to the amount of work done as determined by the Engineer.

2/28/2018

763503 - TRAINEE

Description:

The item shall consist of providing training in the construction crafts in accordance with the requirements stated in the General Notices of this proposal under the Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).

Basis of Payment:

The payment for the item shall be made at a fixed rate of \$.80 per hour toward the hourly rate of the trainee.

8/15/17

763598 - FIELD OFFICE, SPECIAL I

Description:

The field office work shall consist of furnishing, erecting, equipping, maintaining, and removing a doublewide modular office and adjacent parking area. Equivalent rented space may be substituted for the modular field office and its parking area as approved by the Engineer. Rented space may be no more than one mile from the project limits. The Contractor shall submit a specific location layout drawing and construction details for the proposed field office and its parking area for approval by the Engineer. The field office and parking area shall be for the exclusive use of Department Officials, Engineers, Designers, North Region Construction (NRC) Personnel, Consultants, and Inspectors.

The field office structure shall be free of asbestos and/or other hazardous materials. The field office and its parking area shall be constructed and installed in accordance with all applicable city, county, state, and federal codes. The Contractor shall be responsible for obtaining all required licenses and permits for installation and placement of the field office and its parking area. The costs of obtaining such licenses and permits to be incidental to the "Field Office, Special I" Item. The field office shall be available for use by the Department continuously throughout the duration of the project.

Construction and Equipment:

The double wide field office shall be new and have a minimum floor space of 2,000 square feet with minimum exterior dimensions of 50'-0" length by 24'-0" width. The floor to ceiling height shall be nominal 8'-0". The exterior walls, ceiling, and floor shall be insulated. The field office shall be of weather-proof construction, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, safely secured to its support if the support is an inground anchored foundation or otherwise by tie-downs to the ground, and fully skirted with rigid watertight covering overlapping the bottom of the exterior siding to the existing ground.

The Contractor shall provide entries to the field office by constructing a stair and deck platform with canopy at each exterior door. Each entry shall have an exterior light. These entries shall be fabricated using treated dimension lumber, be constructed with hand and safety railing, be designed to last the life of the Contract, and conform to the requirements of the Architectural Accessibility Board and other federal, state and local boards, bodies and/or courts having jurisdiction in the Contract limits.

The Contractor shall construct and maintain an all weather parking area adjacent to the office of at least 5000 square feet and having a minimum of 10 functional parking spaces striped for full size cars. Lighting of the parking area shall be provided. All weather pathways from the parking area to the entrances of the field office shall also be constructed and maintained. This parking area and entrance pathways shall have a minimum of 2" type "C" hot mix on top of minimum 6" graded aggregate subbase. Snow and/or ice shall be removed from the parking area and from the entrance pathways to the field office within 12 hours after each occurrence. Costs for furnishing, placing, and maintaining the aggregate base and hot mix, and for snow and/or ice removal, to be incidental to the Field Office, Special I" Item.

The ground area 30'-0" from around the perimeter of the field office to the field office shall be landscaped and maintained. If the earthen grounds do not have a stand of weed free grass, the surface of this area shall be loosened to a depth of 4" and a satisfactory seedbed shall be prepared free of debris and extraneous matter. The area shall be seeded to a healthy stand of grass or sodded, after which the area shall be watered, mowed, and trimmed a minimum of three times a month during the growing seasons. Cost for this landscaping and maintenance to be incidental to the "Field Office, Special I" Item.

The field office shall have full carpeting, kitchenette facilities, interior paneling, lighting, and plumbing fixtures. The field office shall have a minimum of two (2) exterior doors, each door having a passage and a deadbolt lock. These door locks shall be keyed alike and at least 2 complete sets of keys shall be supplied to the Engineer's representatives. The exterior doors shall be insulated or have storm doors. The field office shall have a minimum of six (6) windows, each window having a minimum glass area of 1150 square inches and a horizontal mini-blind covering the full glass area. The windows shall be insulated or have storm windows. All windows shall be equipped with a locking device. All doors and windows shall have screens installed and repaired when damaged.

At least two (2) outside water service connections shall be provided at the field office. Each water connection shall have a 3/4" frost proof hose bib with vacuum breaker and shall include 100 linear feet of 5/8" minimum diameter reinforced, industrial or commercial grade, and soft rubber hose with spray nozzle per connection.

The field office shall be provided with sufficient natural and artificial light and shall be adequately heated and cooled to provide comfortable working conditions.

The field office shall have satisfactory lighting, electrical outlets, heating equipment, exhaust fan, and air-conditioning connected to an operational power source. Plan and drawing areas shall have individual fluorescent lights situated over their worktables. Replacement fluorescent lights shall be furnished as required. Electrical current, water, and any fuel for heating equipment shall be furnished and the cost of such shall be borne by the Contractor. Maintenance of the heating, exhaust fan, and air-conditioning equipment shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

The Contractor shall furnish and maintain two fire extinguishers and provide one lighted "Exit" sign for each exterior passage door. Fire extinguisher(s) may be chemical or dry powder and shall be UL Classification 10-B:C(min.) and shall be suitable for Types A:B:C fires. A commercial or industrial type first aid and safety kit suitable for project conditions and hazards (including snakebite) shall be provided and maintained to full capacity on a monthly basis.

The Contractor shall provide an alarm system for field office security with electronic, direct connection to a security service provider. The security system shall have interior motion, window, and entrance detectors and built in manual fire alarm. All windows of the field office shall be covered with steel bar grids as a deterrent to forced entry. The Contractor shall provide validated monitoring and service contracts for the length of the Contract. These contracts shall allow a Department authorized project person to deal directly with the security service provider to request service and/or repair.

The Contractor shall furnish and maintain an adequate supply of cold potable water, a minimum 23 cubic foot new refrigerator, and a minimum 900-watt new microwave oven. Maintenance of the potable water supply equipment, refrigerator, and microwave shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

Suitable indoor toilet facilities, conforming to the requirements of the State and Local Boards of Health or of other bodies or courts having jurisdiction in the area, shall be provided. Signs indicating the toilet facilities as being for Men, Women, or Unisex shall be placed on the door and an adequate positive locking system shall be provided on the inside of the doorway to insure privacy. The facility(s) shall be maintained by the Contractor to be clean and in good working condition and shall be stocked by the Contractor with adequate lavatory and sanitary supplies at all times during the period of the Contract.

The Contractor shall be responsible for performing or for making arrangements for all necessary telephone connections and for their maintenance; for providing a new telephone equipment system, for payment of all connections and the new telephone system equipment and its installation; and for final disconnection of the telephones.

The telephone system for the field office shall have a total of 6 lines consisting of 5 direct single lines with call forward busy feature and 1 dedicated facsimile line and have 8 key sets consisting of 1 master key set having privacy feature, and 6 six-button key sets having privacy feature (1 set which may be for wall mounting) and 1 TLS or T1 circuit line for data transmission, all for the official and exclusive use of the Engineer and other representatives of the Department. Location of telephone lines and key sets shall be as directed by the Engineer. Arrangement shall be made to allow a Department authorized project person to deal directly with the telephone company to report outages and/or request repair. The Contractor shall arrange for the installation and initial setup of the specified telephone system including phone company provision of a termination point with smart-jack. Initial installation and setup costs shall be the responsibility of the Contractor as well. All subsequent monthly billings, after initial installation and setup, for the field office telephone system and the TLS or T1 circuit line shall be received and paid by the Contractor. A copy of each of these subsequent bills shall be forwarded to the Project Resident for reimbursement on the contract pay estimate and the reimbursement will be for the amount of the bill only and shall not include any additional mark-up or profit.

For all other utilities, the Contractor shall be responsible for performing or for making arrangements for all necessary utility connections and for their maintenance; for payment of all utility connections, installations, service fees and bills; and for final disconnection of utilities.

The field office interior shall be furnished by the Contractor. The Contractor shall provide new and maintain the following office furnishings, all which are to be approved by the Engineer prior to installation in the field office. Placement of these furnishings shall be as directed by the Engineer. These furnishings consist of 2 drafting tables with sufficient drawers for standard size plans either attached to the tables or in cabinet form each drafting table to have a fully adjustable ergonomic design spring back stool with five leg base having wheel casters, 10 full size office desks each with filing drawer and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 computer station with acoustical panels having minimum 60 NRC rating for privacy screen and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 large conference table for a minimum of 12 people with surrounding chairs with armrests, 2 folding tables minimum 6'-0" by 3'-0" each with ergonomic design straight back chair with armrests, 1 work table, 1 supply cabinet, 2 rough plan racks, 3 legal size filing cabinets with 4 drawers, 3 legal size fire-resistant filing cabinets with lock and key with 4 drawers and meeting fire underwriters' approval for not less than one hour test, 2 stackable steel flat file cabinets for 43" by 32" size plan sheets each cabinet having 5 drawers with full suspension, rear hood, and hinged front depressor, 2 book shelves minimum 3'- 6" by 4'- 6", 3 vertical surface legal size three compartment pockets, 2 dry erase boards minimum 4' by 3' each with markers and erasers, and 2 cork bulletin boards minimum height 3' by 2'. These office furnishings will remain the property of the Contractor at the conclusion of the project.

The Contractor shall also furnish new and maintain the following office equipment for the field office, all which are to be approved by the Engineer prior to installation. Location of the office equipment shall be as directed by the Engineer. The required equipment will enable the Department to synchronize project record keeping and office functions. The equipment shall be delivered in working and useable condition:

8 heavy-duty calculators having extra large 12-digit fluorescent display, full size keyboard with contoured keys, two-color ribbon printer, and AC powered;

1 Muratec MFX-2855D or Toshiba e-STUDIO 2330c or approved equal all-in-one copier which includes scanner, printer, and fax. Copier to have high speed wireless and network capability. Copier shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network. Copier to have zoom and preset reduction and enlargement features, automatic two (2) sided copying, automatic document feeder with minimum 30 sheet capacity with automatic stapling capacity;

1 compact plain paper copying machine and cabinet with stationary platen, bypass feeding, and dual loading cassette system with cassettes for letter, legal, and ledger size paper. Copy machine to have zoom and preset reduction and enlargement features, automatic two (2) sided copying, automatic document feeder with minimum 30 sheet capacity, and 20 bin collator with automatic stapling capacity;

1 micro cassette recorder, having fast playback, voice-activated system, three-digit tape counter, silent auto-stop and pause, two tape speeds, one-touch and follow-up, built-in condenser microphone, cue and review, and rechargeable with combination battery charger/AC adapter;

1 telephone answering machine having all-digital recording, 14 minute message capacity, selectable message time, voice prompt assistance, day/time stamp, call screening, two-digit LED message indicator, toll saver, power failure memory back-up, and message interrupt from any station;

6 compact digital cameras with 10 megapixels or greater, maximum dimensions of 3" x 5" x 3, built in flash, autofocus, video mode LCD for review of images, LCD viewfinder acceptable, removable memory compatible with compact flash, or secure digital (SD) or secure digital high capacity (SDHC), ISO compatible with 100, 200, 400 standard of quality of better, and memory cards supported by camera of 8 GB or better;

1 Canon Vixia HF M300, Panasonic HDC SD60, Samsung HMX-R10 or approved equal digital video camera, 1080p, CMOS optical sensor, digital format H.264, digital photo mode, camcorder

sensor resolution 3.2 mega-pixels or greater, SD memory expansion card for still images, connection type, HDMI, USB, component video/audio output;

1 video projector, DLP projector, resolution of 1280x720 or greater, 16.7 million colors, contrast ratios of minimum 2000:1 or greater, video inputs to include SVGA, HDMI, S-Video and RGB, component, video modes minimum 720p or greater;

1 heavy duty 3-hole punch with minimum 40 sheet capacity;

1 extra heavy duty stapler with anti-jam feature having capacity up to 200 sheets; and

1 comb binding machine with manual punching capacity of 10 sheets having a minimum binding capacity of 150 sheets.

Consumables as required to manage the business of the project for the field office shall be provided for all office equipment for the length of the Contract. These consumables shall be furnished on request and shall include but not be limited to paper, tapes, ribbons, various size plastic combs, rolls, toner, cleaning kits, microcassette tapes and batteries, answering machine cassettes, camera batteries and memory cards/sticks, DVD and CD R/RW media, printer ink cartridges, etc.

Maintenance of all office equipment shall be provided for by a validated service contract for the length of the Contract. This service contract shall allow a Department authorized project person to deal directly with the service organization to request repair.

Computer Requirements for the Field Office:

Included in the unit price bid per month for the Field Office on this project will be four (4) IBM compatible Microcomputer Systems both which will be furnished and maintained by the Contractor for use by the Engineer. The specified computer systems will synchronize the construction management functions of the Department to monitor, report, and perform the accounting of the project work. The computer systems and all their related equipment specified below shall be furnished new and remain the property of the Contractor at the conclusion of the Contract. A detailed listing of the proposed computer systems and all their related equipment to be provided by the Contractor shall be submitted for approval by the Engineer prior to furnishing the Microcomputer Systems. The Microcomputer Systems shall be Laptop Computer Systems each with docking station. Each of the four (4) Microcomputer Systems shall consist of:

Central Processing Unit (CPU) - Lap Top

Intel Core i5 or Core i7 series processor and wireless networking capability included,

Minimum 4.0 GB RAM with expansion capability to at least 8.0 GB, and

Microsoft "Windows® 7 Professional with 64 bit support operating system with latest updates;

Memory (Storage)

DVD+RW or Blue Ray BD-RE (rewritable) drive with support for DVD RW support capability, and 120GB hard drive minimum, integrated Ethernet 10/100. Included software shall support system and data backups with the DVD/Blue Ray device using double/dual layer DVD discs;

Monitor (LCD)

Monitor for docking station and docking station. 21" minimum diagonal visual area flat panel capable of multiple frequency color graphics, 1440x900(wide) or 1280x1024 or better resolution, 16.7 million display colors, 5 ms response time, D-Sub and DVI video input ports and

Laptop - shall have 15.4" diagonal display minimum;

Color Graphics Card

PCIe video card or integrated video;

Keyboard

Keyboard shall be ergonomic, enhanced layout minimum with keyboard interface cable;

Printer

Laser printer, color, capable of printing 8-1/2"x 11", 11"x17" and envelope, having wireless and hard line network connectivity, printers shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network;

Software

The latest version programs for application management (operating system), word processing, spreadsheet, and anti-virus shall be provided with all user manuals. Upgrades, maintenance, and full technical support by the manufacturer shall be provided for the length of the Contract. The required software will enable the Department to synchronize accounting and record keeping functions between the project, District, and Department offices. A list of programs to be provided shall be submitted to the Engineer for approval. Software, other than for application management and anti-virus, is to be delivered unopened to the Department's administrative office. All software is to be compatible with and for use to run on "Windows® 7 Professional" or "Windows® XP Professional". The required applications software follows and is to be latest version unless noted:

collection - "Office 2010 Business Professional" with Word, Excel,
antivirus - "Norton™,

schedule - Primavera Project Planner version 3.1 SP3 or latest,

replication - Adobe Acrobat X Suite Software w/Adobe Photoshop® CS5 suite, and
software - supporting creation of DVD +/- R/RW disks (supporting double layer media writing) and DVDR and DVDRW disks using DVDRW drive, for example: Ahead Nero, Roxio DVD/CD Creator, or some equivalent product. Note: software commonly included as part of the standard CDRW upgrade/standalone package is acceptable if included with the unit,

An electrical outlet with dedicated circuit for the main computer unit,

A wireless optical mouse with proper driving software having complete Microsoft emulation,

Necessary cables for proper operation,

24 bit Sound Blaster compatible PCI soundcard with quality desktop speakers,

A combination surge, spike, and noise protection device with receptacles for all peripherals (may be in combination with the UPS power supply),

A wrist rest suitable for use with the furnished keyboard, and

All cards, hardware, and operating, anti-virus, and equipment software to be fully installed and operational;

Related Equipment

Wireless networking hub/router, 802.11g or better with all associated hardware (adapters, cables, etc) and software to enable wireless networking for resource/equipment sharing among all office computers and printers, the cost of wireless and network connections and service to be incidental to the "Field Office, Special I" Item, and

An uninterruptible power supply (UPS) units for protection from power loss or fluctuation, minimum of 6 outlets, adequate to provide a minimum of 30 minutes backup power for an orderly shutdown of the computer system with software and connections for automatic system shutdown;

Maintenance and Service

Maintenance of all specified equipment and components shall be provided for by a validated service agreement for the length of the Contract. Maintenance (upgrades, replacement, and full technical support) for each software application shall be provided for by a validated maintenance agreement for the length of the Contract. These agreements shall allow an authorized project person to deal directly with the service organization to request repair or the maintenance organization to request assistance; and

Supplies

Consumables as required to manage the business of the project shall be provided for the Microcomputer Systems in the field office for the length of the Contract. These consumables shall be furnished on request and include but not be limited to memory cards/sticks compatible with provided digital cameras having 8 GB or greater capacity and compatible with provided computers, DVDR and DVDRW media compatible supporting operational minimum to maximum speed of the DVD/RW drive unit, cut sheet paper and labels compatible with the printers, hardware and screen cleaners, printer ink cartridges, and toner cartridges.

Maintenance of the field office including its entrance and adjacent parking area, for the time required, shall consist of maintenance and/or replacement of all provided items, security system, furniture and equipment, computer systems, providing lavatory supplies, providing trash containers and waste baskets, providing entrance mats at each door, providing replacement items for lighting fixtures, maintaining all utilities, providing satisfactory and sanitary janitorial and waste disposal services twice a week, providing cleanup of trash and debris on the parking lot and landscaped area once a week, and shall be included in the monthly unit cost.

The Contractor shall provide and deliver a current copy of all validated field office, equipment, and computer maintenance, service, assistance and/or monitoring agreements and/or contracts as mentioned hereinabove to the Department's administrative office on or before the first day the field office is ready for use.

Method of Measurement:

This item will not be measured but will be paid for on a monthly basis. Partial months will be paid at the rate of 0.033 months per day.

Basis of Payment:

The field office will be paid for on a unit price bid per month, which price shall be full compensation for performing the work specified, obtaining all licenses and permits, and furnishing of all materials, labor, tools, equipment and incidentals necessary to maintain the field office and its adjacent parking area and restore the field office area and adjacent parking area to match the original site condition. No separate payment will be made for costs involved for removing hazardous material or underground tanks to install this field office or its parking area. One (1) unit of payment will constitute erecting, furnishing, equipping, maintaining, and removing the double wide field offices, its entrance and parking area.

Payment will be made only for the actual number of months that the office is acceptably provided by the Contractor.

Per Standard Specification subsection 108.02, the Engineer shall issue a Notice to Proceed and stipulate the date on or before which the Contractor is expected to begin work. The field office, its entrance, and parking area and all materials and equipment shall be ready for use at least seven calendar days prior to the date which the Contractor is expected to begin work as stipulated in the Notice to Proceed and before any construction operations begin. Contract time charges shall begin on the day work actually starts or on the date stipulated in the notice to proceed, whichever is earlier. There will be no delays in beginning the contract time charges due to delays in preparing the field office.

3/27/2019

763652 - CLASS 1 TOW TRUCK

Description:

This work is furnishing and operating on a stand-by basis, one extended cab tow truck to remove disabled vehicles, vehicles involved in accidents, and small non-hazardous debris, on SR 141, I-95, and I-295 within the project limits. The tow truck shall be available and positioned on site, at a location determined by the Engineer, whenever a multi-lane roadway within the project limits is reduced to a single lane. This service is to be provided during short-term and long-term traffic control phases and will continue until the completion and removal of the final traffic control phase, unless otherwise directed.

Materials:

TOW TRUCKS: Provide one extended cab tow truck on site during the referenced hours of operation. Make one spare "back-up" extended cab tow truck available for the project, as specified. The back-up tow truck is to meet all requirements and is to contain all equipment required for the extended cab tow truck, when on duty.

The tow truck's base of operations must be within a 10 mile radius of the project limits.

GENERAL REQUIREMENTS: The following are the MINIMUM requirements for genuine parts, accessories, equipment, and safety features, and are to be considered standard, whether mentioned or not.

STANDARDS, CODES, RULES, REGULATIONS: Each tow truck, including the back-up tow truck, is to conform to the Delaware Motor Vehicle Code.

Each tow truck, including back-up tow truck, is to comply with all current applicable Federal Motor Vehicle Safety Standards, Federal and Delaware Exhaust Emission and Noise Standards, Environmental Protection Agency (EPA), and Occupational Safety and Health Administration (OSHA) requirements, with appropriate decals stating compliance.

The tow trucks are to conform to the latest codes, standards and practices of the following professional organizations:

- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- American Trucking Association (ATA)
- American Welding Society (AWS)
- Battery Council International (BCI)
- British Standards Institute (BSI): Limits & Fits
- International Standards Organization (ISO)
- Industrial Fastener Institute (IFI)
- National Truck Equipment Association (NTEA)
- Society of Automotive Engineers (SAE)
- Steel Structure Painting Council (SSPC)
- Truck Body Equipment Association, Inc. (TBEA)

Each tow truck is to be certified for 16,500 lbs. (7484 kg) Gross Vehicle Weight Rating (GVWR), minimum. Identify the GVWR in cab or on door as the final complete certification label (minimum rating).

Furnish and identify by decal in cab or on door Gross Combined Weight Rating (GCWR) to indicate the approved weight which can be towed.

Each tow truck, including back-up tow truck, is to bear the latest applicable Delaware Official Inspection Sticker as required for permanent license plates by Delaware State Inspection Laws.

The truck and wheel hoist is to be of the design and type for a one-man operation of short distance towing.

VEHICLE COMPONENTS: Alarm-backup: Ref: ECCO 450, Shock Mounted

Chassis: 16,500 lbs. (7484 kg) GVWR manufacturer's rating, minimum, certified in cab or on door. Front bumper; push type extending full width with a guard extending the height and width of front grill. The bumper is to be rubber faced.

Light Bar and Arrow: Light Bar meeting the requirements of and in accordance with Delaware Code. Provide an arrow panel, approved for use in Delaware, 36" high by 72" wide, minimum, with a raise lower mechanism, and a control box-mounted in cab within reach of the operator. The control box is to incorporate lights to signify the arrow panel mode. The arrow panel is to be capable of displaying a left arrow, right arrow, double arrow and four-corner caution.

Safety: Provide a fire extinguisher rechargeable with a vehicle mount. Mount fire extinguisher in cab for easy and quick access.

WHEEL LIFT AND BOOM: As per manufacturer's specifications, and as follows:

Boom Structural Rating (Crane)

Fully retracted 35.58 kn. at 30 degree elevation

Fully extended 8.9 kn. at 30 degree elevation

Wheel Lift: Provide wheel lift system with (3) functions:

Provide a wheel lift that can hydraulically raise and lower

Extend and retract

Tilt function independently or simultaneously

The tilt function provides means of engaging standard "L Arms" to the towed vehicle either on uneven terrain or in mud and snow conditions. The retracting wheel-lift boom in combination with tilt feature allows the towed vehicle to be retracted close to the tow truck for better weight distribution.

CONTROLS: Provide controls on both sides of the body. Design controls to operate independently or simultaneously. Variable speed of all functions is controlled by the handle movement. Provide the following:

Single cable winch hydraulic, with wheel lift and boom, and body on truck chassis

Tow sling with chains

Wrecker special light bar

Upper and lower work lights

Cable tensioner on winch

Switch Panel

Throttle Control (Manual or Electric)

Push Bumper

Engine Driven Pump

EQUIPMENT: Equip each tow truck at the Contractor's expense with the following items.

One cellular phone (complete with on-line cellular phone service)

Scanner

CB radio

Fuses – (Highway Flares) – 36 minutes

Pen and paper

Clipboard

Emergency phone numbers

Vests – two

Hard hat

SUPPLIERS: Class 1 Tow Truck Services shall be provided by: B&F Towing, 449 Old Airport Road, New Castle, DE, 19720 (Phone 302-328-4146); First State Towing, 424 Old Airport Road, New Castle, DE 19720 (Phone 302-994-9244); or approved equal.

Construction Methods:

SERVICES TO BE PROVIDED: The Tow Truck Operator (TTO) is to be position on-site during the designated hours of operation. The TTO shall assist motorists whose vehicles have suffered mechanical failure or have been involved in minor accidents. The TTO is responsible for clearing the highway of automobiles, motorcycles, small trucks (vehicles with gross weight of 20,000 lbs. (9071.8 kg) or less and small, nonhazardous debris.

These incidents are those that are encountered in the normal course of patrolling SR 141, I-95, I-295 or those called out by the DeIDOT Transportation Management Center (TMC), Troop 6 of the Delaware State Police, Town of Newport Police, or by the Engineer.

Where no apparent physical injury is evident, the TTO is to request drivers to drive or be pushed or towed to a drop off location to open the lane to traffic. The TTO is to remove the vehicles from the highway to a drop off location after driver's consent or when directed by the police. Should the TTO encounter a major incident, their primary duty is to immediately inform the police and DeIDOT TMC and to protect the incident scene by the use of their vehicle combined with the use of the highway flares, and truck-mounted arrow board. Where there is apparent physical injury call 911 and report known accident details and request assistance. A major incident contains any one of the following items:

A Fatality

An Injury

A load that is hazardous as identified by a placard or cannot be identified as being nonhazardous

A disabled vehicle of 20,000 lbs. (9071.8 kg) or more, or badly damaged vehicles(s), that cannot be pushed or towed by the tow truck. In this instance, the TTO is to make arrangements to secure a Class 2 tow truck or a ramp truck to remove this type of vehicle (s) as appropriate.

Debris or large spilled loads that are impossible for the TTO to remove.

WHERE APPARENT PHYSICAL INJURY OR DRIVER INTOXICATION IS EVIDENT OR SUSPECTED, DO NOT MOVE VEHICLES INVOLVED IN AN ACCIDENT UNTIL SO DIRECTED BY POLICE.

Do not follow directions or requests by vehicle operators or occupants. Contact police immediately. Remain at the scene prepared to assist police.

Accident Vehicles: Under no circumstances is the TTO to attempt a repair to an accident vehicle in order to make it mobile. For example, the TTO is not to use pry bars or winch cables to pull fenders away from tires, change tires damaged as a result of an accident, or remove/repair any body parts. All accident vehicles of non-reported accidents will be removed as promptly as possible to the nearest designated drop-off location.

Unattended Vehicle: If the TTO encounters any unattended vehicle that is interfering with the normal movement of traffic (such as blocking a lane or a partial lane of traffic) or constitutes a safety hazard, the TTO is to immediately contact the DeIDOT TMC and wait to receive police approval to remove the unattended vehicle to a drop-off area or other place of safety. Unattended vehicles not interfering with traffic nor posing a safety hazard are also to be reported to the DeIDOT TMC by the TTO, but no further action will be necessary by the TTO unless directed to do so by the Engineer or police.

Assistance to Law Enforcement Officers: There may be some instances where TTO may be requested to lend assistance to Law Enforcement Officers. TTO is to follow the instructions of the officer at the scene of any incident. The instructions of the officer on the scene override and supersede any conflicting obligations or duties of the contractor or the TTO set forth herein.

During its contracted hours of operation, the tow truck is to be exclusively dedicated to the needs of this Project and may not be removed from the site for any reason other than the towing of a vehicle to a drop-off area, or replenishment of expendable items such as fire extinguishers. Temporary removal of the tow truck from the site for those reasons is not to exceed 10 minutes. The towing vehicle shall be fully fueled at the start of each shift so as not to require refueling during the shift.

General Requirements: At the beginning of each service call, or upon finding any disabled vehicles, the TTO is to notify the DeIDOT TMC of location, model, color and plate number of disabled vehicle. At the end of each service call, the TTO is to notify the DeIDOT TMC and fill out an incident information form and submit to the TCC on a weekly basis.

Prepare this form and submit it for DeIDOT TMC approval prior to beginning this service. Obtain and keep adequate supply of forms through the life of the Contract.

No compensation of any type (tips, etc.) can be accepted by the TTO from the motorist. Failure to adhere to this requirement will result in an immediate dismissal of the TTO.

The TTO, when necessary, is to place the appropriate temporary traffic control devices from the tow truck to protect the incident site.

The TTO, unless so directed differently by a law enforcement officer, is to follow normal traffic laws.

The tow trucks are to continuously patrol the project limits or are to be stationed at location(s), as directed by the TCC.

Do not tow any vehicle without vehicle operator's approval or police direction. Do not tow any vehicle involved in an accident until so directed by police.

Transport individuals to the field office to use phone when TTO's mobile phone is inoperable.

Be responsible for any damage caused by services performed under this item.

Notify the DeIDOT's TMC of all disabled vehicle incidents and accidents as soon as possible.

Have the tow truck at the site of the disabled vehicle within 10 minutes of knowing that a tow truck is required.

Two-Way Communications and Cellular-Phone Service: The TTO is to maintain two-way communications with DeIDOT's TMC and the Engineer using a cellular phone. Cellular phone is to be provided by the Contractor. The cellular phone is to include a phone unit, maintenance, and all service charges for tow truck.

All costs associated with the cellular phone service are incidental to the Class 1 Tow Truck item. It is anticipated that the majority of the communication effort will be via the cellular phone. The communication effort is a critical element of these services.

A brief summary of these communication elements is as follows:

TTO informs DeIDOT's TMC of a major incident.

TTO to call for assistance at the request of the motorist.

TTO to communicate with and take orders only from the Engineer, state, or local police.

Notifying DeIDOT's TMC of an unattended vehicle.

Dispatching of tow truck to an incident.

TTO requests the need of Class 2 Tow Truck.

Motorist requests the service of a tow truck or other assistance.

Motorist requests the service of another tow truck.

Informing the state police, local police, and the Engineer of any incident involving a tow truck.

When the need arises to use the cellular phone to summon assistance for the motorist, each disabled motorist will be limited to one local (as defined by the cellular phone service area) three minute call (a busy signal, voice mail or answering machine or a does not answer, does not qualify as a call).

Use of the cellular phone for any other purpose than communicating with the police, the Engineer, DeIDOT's TMC or summoning assistance for the motorist, is strictly prohibited. Violation of this requirement is grounds for immediate dismissal of the TTO.

The Contractor, at the request of the Engineer, is to submit to the Engineer copies of the monthly cellular phone service bills showing the telephone numbers of all calls made and all calls received.

Disabled vehicles discovered on SR 141, I-95, or I-295 with the operator present or incidents identified by the DeIDOT TMC, just at the end of a shift period or discovered by the TTO while returning to the Contractor's location, are to be handled in a normal response manner even if this means staying out beyond the normal end of the shift period.

When a disabled vehicle is found, the TTO is not to drive past a disabled vehicle when the operator is present.

The TTO is to immediately contact the DeIDOT TMC.

The TTOs daily log, incident information form, will be used to document this event.

Disabled vehicles discovered on SR 141, I-95, or I-295 without the operator present, just at the end of shift period or discovered by the TTO while returning to the Contractor's location are to be immediately reported to the TMC.

If the disabled vehicle poses no hazard then no further action by the TTO is necessary.

SERVICE PATROL AREAS: The tow truck will patrol both directions of SR 141, I-95, or I-295 within the limits of the "Begin Construction" sign and the "End Construction" sign.

The detection of damaged or disabled vehicles will be primarily via the DeIDOT TMC, police, or by TTO. However, TTO will also be dispatched via two-way radio or cellular phone to an incident location by the police, DeIDOT TMC, or the Engineer.

The tow truck will remain in the assigned area and only enter into another area to give assistance only at the direction of the TCC.

DROP-OFF LOCATION: DeIDOT will designate a location within the project area to be known as the "drop-off location". The TTO is to tow or push the vehicle, and transport the vehicle occupants to the drop-off location. The motorists can request to call a specified towing firm ("personal request"), or to call a relative/friend to assist them from that location.

Should it be impossible to transport the vehicle occupants to a safe area where they can wait for assistance, the TTO is to immediately call the DeIDOT TMC to inform them of this and the TTO is to wait with the disabled vehicle and its occupants until the police arrive.

Contracted companies (The "Contractor") and/ or their employees/ drivers are not allowed to accept gratuities, perform secondary towing service from the designated drop site, recommend secondary tows, or recommend repair/body shops.

SECONDARY TOWS: If the motorist does not request a specified towing service, repair facility, or other business or individual to assist him/her at the drop-off-location, the police defers to the towing service/AAA system that is utilized in the area.

The contracted tow truck company may not receive a call for a secondary tow from the drop-off location even if the company participates on the AAA list and would ordinarily be "next up" on the rotation. The contracted tow truck company would be eligible for AAA tows again at the conclusion of the hours of operation.

If the motorist has to be given the names of another tow company, this information is to be supplied by the police or the Engineer in a list format as a handout. TTO may provide such a list to the motorists. The towing company supplying the tow trucks and the TTO is prohibited from conducting any type of secondary tows.

The TTO is also prohibited from giving out the names or recommending any repair/body shop establishments.

Violations of any portion of this section are grounds for immediate dismissal of the TTO.

HOURS OF OPERATION: The tow truck shall be available and positioned on site, at a location determined by the Engineer, each weekday between the hours of 6:00 AM to 9:00 AM and again 4:00 PM to 7:00 PM. This service is to be provided during long-term traffic control phases 2 thru 5 and will continue until the completion and removal of the final traffic control phase, unless otherwise directed.

The TTO is to anticipate being stationed on site or patrolling the area during all types of inclement weather unless instructed not to do so by the Engineer.

STARTING OF TOWING SERVICE: Provide tow truck and all their equipment, and qualified TTOs starting at the time that long-term traffic control (i.e. Construction Phase 2) is established, unless otherwise directed by the Engineer.

Obtain the Engineer's approval of the following items 30 days before the start of the towing service:

Insurance Requirements

Incident Information Forms

Tow Trucks and all Equipment

TTOs' Names and Credentials

TTOs' Training Program

The Engineer will inform the Contractor of the date and time he is to begin the Towing Service.

DAMAGE COMPLAINTS: Upon receiving a damage complaint from a motorist assisted by the Contractor, that the Contractor damaged their vehicle while lending assistance, notify the Engineer regarding the nature of the damage complaint and its disposition.

The Contractor is to reply to the motorist by telephone within 24 hours of receiving the damage complaint notification. If necessary, send either its authorized representative, or its insurance company representative to inspect the vehicle and complete an incident report within 48 hours after receiving the damage complaint. If the investigation shows that damage to the vehicle could have been caused by the Contractor, negotiate in good faith to try and resolve the issue and shall report to the Engineer the result of the negotiations.

Resolve all complaints within a reasonable period of time after being received. All repair costs resulting from these damage complaints are the responsibility of the Contractor.

ACCIDENTS INVOLVING TOW TRUCK: Should any tow truck become involved in any type of accident, the following procedures shall be followed:

The TTO, if he/she are able, will immediately inform the police and the DeIDOT TMC of the exact nature of the accident and request necessary assistance (ambulance, tow truck) from the police including the presence of a police officer to investigate the accident and prepare an accident report (required by law for a reportable accident).

If the accident is non-reportable (vehicles can be moved, no injuries, no fatalities), all vehicles should be removed from SR 141, I-95, I-295, and its ramps as soon as possible. If not, the accident scene should be protected by signs, cones and flares as may be necessary.

The TTO will follow normal driver procedures and adhere to current Delaware laws and regulations regarding post-accident procedures, including but not limited to, the exchange of driver information (names, addresses, phone number, insurance information) and never flee the site of the accident.

The TTO may only resume the patrol of his/her area when the above requirements have been satisfied and:

- The police have prepared a written accident report or have instructed the TTO that they are unable to do so (applies to nonreportable accidents only).
- The tow truck is in a condition to resume patrolling.
- The TTO is physically able to resume patrolling.
- Approval has been given by the Engineer to resume patrolling.

Should either the tow truck and/or the TTO be unable to resume their patrol area, Contractor must have the "Back-up" tow truck and a fully qualified TTO ready to cover the project area on the next regularly scheduled shift.

Repairs to damaged tow truck(s) must be made as quickly as possible.

Every accident involving the tow truck will be reviewed by a committee consisting of a representative of the Contractor, the Engineer and if applicable the police.

The main purpose of this review effort will be to insure that the tow trucks are operated in the safest manner possible. Should it be determined by the committee that the accident in question could have been avoided by the TTO, then the TTO may be subject to the following disciplinary actions:

First Avoidable Accident - Letter of Reprimand

Second Avoidable Accident - 1 Week Suspension

Third Avoidable Accident - 1 Month Suspension

Fourth Avoidable Accident – Termination

All cases will be reviewed on their own merit including the severity of each accident.

THE TOW TRUCK: Provide confirmation that the tow trucks conform to all the specifications specified. Provide a tow truck plus a "back-up" tow truck.

Prior to the commencement of service, the Engineer will inspect each vehicle designated for the Project to ensure that it meets or exceeds safety requirements. Succeeding inspections will occur periodically as required by the Engineer.

Any unsafe or poorly maintained vehicle(s) are to be removed from service or repaired as directed.

Provide a "back-up" tow truck to complete the shifts of the tow truck removed from service. The Contractor is to have the "back-up" tow truck available for service at all times.

All tow trucks are required to have a current Delaware Vehicle Registration Card and are required to meet Delaware Vehicle Insurance requirements.

TOW TRUCK EQUIPMENT: Each tow truck is to be equipped at the Contractor's expense as specified.

PRE-OPERATION INSPECTION: Prepare and print inspection/inventory sheet. The TTO is required to complete a preoperation inspection of the vehicle as well as inventory all the tow truck equipment called for, prior to the start of each shift. An inspection/inventory sheet is to be completed prior to the start of each shift,

and is to be kept on file by the Contractor, and is to be made available to the Engineer upon demand. Any item missing is to be replaced before the start of the shift. The Engineer reserves the right to be present at any and all preoperating inspections and to prohibit the commencement of any tow truck duty if the equipment in the tow truck is not in conformance with specifications.

VEHICLE IDENTIFICATION: Furnish and install, on both sides of the tow trucks, a magnetically attached sign or approved equal, to all tow trucks used on this project. Attach the signs to the vehicle in a prominent position. Maintain signs in a suitable condition as directed.

Size of signs for tow trucks is to be a minimum 18" high by 30" wide with 3" letters. Signs' legend to be orange background with black letters. Signs' lettering is to read as follows:
Towing Service Provided FREE By DelDOT

FUEL: Supply, at the Contractor's cost, all items required for the operation of the tow truck including but not limited to fuel, oil, antifreeze, lubricants, etc.

"BACK-UP" TOW TRUCK: The Contractor will be required to have one spare "back-up" tow truck available for the Project. The "back-up" tow truck is to meet all specifications and is to contain all the equipment called for. The "back-up" tow truck is to be on site within 20 minutes of the time a permanently dedicated tow truck is taken out of service for any reason.

VEHICLE MAINTENANCE AND STORAGE: All tow trucks (including the "Back-Up" tow truck) when not on duty are to be stored at the Contractor's location in a secure area or at another area. The tow truck is to patrol the assigned area, or is to be stationed at agreed location(s), respond to communication dispatches for service, and use DelDOT's identified designated drop-off location. The Engineer will inspect all tow trucks, including spares; prior to the service start date. Keep on file at the Engineer's Office and the Contractor's Office all documentation of the tow truck identification number and successful completion of the inspection. Tow truck maintenance is to be performed during off-duty hours by the Contractor at his expense. The Contractor may remove the tow trucks from the site or from their storage area during off-duty hours for maintenance, repairs and replenishment of supplies.

EMPLOYEES/DRIVERS/OPERATORS

General: All TTOs are required to have a safe driving record, and medical certification. TTOs are to be 18 years of age or older. Potential TTOs will be subject to driving record and criminal background checks by the Department. Potential TTOs are to be sufficiently experienced in the tasks of tow truck operations to provide safe and proper service and are to be capable of demonstrating their operating abilities prior to beginning their first day of work. Additionally, the TTOs are expected to exercise reasonable judgment in carrying out their duties.

LICENSE REQUIRED: All TTOs are to have a current Delaware Class C Driver's License.

SPECIAL TRAINING AND KNOWLEDGE: All TTOs including back-up operators/drivers, are to complete a special Expressway Service Patrol Training Program put together and taught by a training organization, such as WreckMaster, approved by the DE Towing Association, and approved by the Engineer. The course is to include education on the details of the Expressway Service Patrol Program, minor vehicle repair, customer service, and roadside service safety. No driver will be allowed to begin duty without attending this mandatory training class.

At the end of each 12-month period from the notice to proceed, the Contractor is to prepare and conduct, at its own cost, an 8-hour refresher-training course (during off-duty hours) for all TTOs. The training program and refresher course are to insure that the TTO is fully knowledgeable in the following areas:

- DelDOT Work Zone Safety Standards and Traffic Control
- Tow Truck Operator Manual
- Proper Tow Truck Maintenance
- All Towing Safety Procedures
- Driver Vehicle Daily Inspection report must be in truck with the driver
- Tow Truck Preventive Maintenance Procedures
- Proper Tow Truck and Equipment Pre-Operation Inspection Procedure
- Lubrication Procedures
- Control/Gauges

Proper Start Up
Use of Transmission
Backing Procedures
Over the Road Techniques
Proper Shutdown
Air Tank Drain
Proper Setting of Brakes
Cleaning of Equipment
Post Inspection of Tow Truck and Equipment
Proper Connection of Towed Vehicle
Equipment Being Towed
Securing Towed Vehicle
Emergency Warning Lights
Towing of Vehicle
Parking of Towed Vehicle
Securing Towing Device
American Red Cross (or equivalent) First Aid

Knowledge of the geographic area of Delaware in general and of the Project area in particular is required. This is to include such items as names of interchanges and local roads and directions to major landmarks and attractions.

Uniform and Other TTOs Equipment: Provide at least two uniforms to all the TTOs, keep uniforms clean, and immediately replace if they become torn or stained. The uniform is to consist of a jump suit with reflectorized tape on the front and back or a Contractor submitted uniform. This uniform is only be worn while on duty or while traveling to and from the assigned area. The Contractor is also to supply the TTO with protective shoes or boots, jackets, reflectorized rain gear and hard hats.

Supply each TTO with a photo identification card which contains only their names and current photo with no reference to any private tow company. This card is to be prominently displayed on their uniform.

Driving and/or Working Under the Influence of Drugs or Alcohol: Use of alcohol or illegal drugs is grounds for immediate dismissal of the TTO by the Engineer. The Contractor is then responsible for finding a replacement TTO by the beginning of the next TTO shift.

TTO BEHAVIOR: TTOs will be considered as representatives of the Department and their appearance and behavior in front of the general public is to be impeccable. Violations of proper behavior and etiquette will not be tolerated.

Such violations are listed as follows:

- Poor grooming, poor personal hygiene
- Dirty, torn or worn uniforms
- Sleeping during normal working hours
- Unsafe acts or violations of traffic laws
- Leaving motorists in unsafe areas, such as in a median divisor or alone on a narrow shoulder without another tow truck or police vehicle present
- Foul language or inappropriate hand gestures
- Yelling or being rude to motorists
- Falsifying information orally or in written form
- Damaging a motorist's vehicle due to careless act
- Insubordination
- Demeaning the Department of the Towing Service Program
- Arriving to patrol area late or leaving patrol area early.

Although each case will be weighed on its own merits, violation of any of the above items by the TTO will be dealt with as follows:

First offense: Written reprimand

Second offense: 1 Week suspension

Third offense: 1 Month suspension

Fourth offense: Termination

Multiple and continual violations by more than one TTO may result in more severe penalties. These violations are not intended to be an exhaustive list. The Engineer reserves the right to characterize any unsatisfactory action as a violation and subject to the above actions.

RECORD KEEPING/REPORTING/AUDITS: The TTOs are required to call the DeIDOT TMC at the beginning and end of each shift, when on break and leaving the assigned patrol area, and are required to complete a daily log which documents beginning and ending shift times, vehicles assisted, type of assistance rendered, any time he/she left the Project site, and total mileage for the day.

These records are to be made available upon request of the Engineer and/or the TMC, or his authorized representatives to inspect and audit.

DISPOSITION OF TOW TRUCKS AFTER THE REQUIRED COMPLETION DATE

At the completion of the contract requirements for this item, the magnets used on the doors of the tow vehicles shall be turned over to DeIDOT TMC.

Method of Measurement:

The quantity of "Class 1 Tow Truck" will be measured as the actual number of hours for which the tow truck was in-service for the project, in accordance with specific timelines outlined above.

Basis of Payment:

The quantity of "Class 1 Tow Truck" will be paid for at the Contract unit price per Hour. Price and payment shall be full compensation for furnishing all labor, materials, and equipment; assistance to motorists and delivery of vehicles to the designated drop-off location; for all tools, equipment, labor, and all necessary incidentals to complete the work.

3/13/15

763653 - CLASS 2 TOW TRUCK

Description:

This work is furnishing and operating a “Class 2” tow truck, ramp truck and/or similar towing vehicle on a per call basis when Construction Phase 1 through 2 traffic restrictions are in full effect on SR 141, I-95, I-295, or as directed. The “Class 2” tow truck or ramp truck must be available 24 hours per day.

Equipment:

Provide the following vehicles for removal of disabled vehicles when directed.

Class 2 Tow Truck - For Buses (including DART), large trucks and semi-trailer rigs.

Ramp Truck - Flat bed truck with winch for wreck removal.

SUPPLIERS: Class 1 Tow Truck Services shall be provided by: B&F Towing, 449 Old Airport Road, New Castle, DE, 19720 (Phone 302-328-4146); First State Towing, 424 Old Airport Road, new Castle, DE 19720 (Phone 302-994-9244); or approved equal.

NOTE – SUPPLIER OF CLASS 2 TOW TRUCK SERVICE MUST BE THE SAME AS THE PROVIDER OF CLASS 1 TOW TRUCK SERVICES.

Construction Methods:

Upon notification that a disabled vehicle requires removal and operator approval is obtained or removal is directed by police, and it is determined that the Class 1 tow truck service is not suited for the vehicle in question, contact the approved tow truck service and order removal with the required type of towing vehicle (s). Do not tow any vehicle without vehicle operator approval or police direction. Inform the vehicle operator that the tow to the “Drop-Off Location” is provided at no cost.

Respond by being en route to the site within 10 minutes of notification with the required type of towing vehicle(s).

Be courteous to operators or occupants of vehicles at all times.

Tow vehicles requiring repair or wrecked vehicles to the DelDOT designated “Drop-Off Location”. Do not transport vehicle beyond this point.

Remove vehicles requiring repairs or wrecked vehicles utilizing a ramp truck when towing is not advisable. Tow vehicles requiring repair or wrecked vehicles to the DelDOT designated “Drop-Off Location”. Do not transport vehicle beyond this point.

Tow abandoned vehicles and vehicles involved in accidents where the operator is no longer available to the DelDOT designated “Drop-Off Location”.

Do not tow vehicles which were involved in an accident until so directed by police.

Refer motorists to the Class 1 Tow Truck operator for phone service or transportation assistance.

Be responsible for any damage caused by towing operations.

Sign-in with the Class 1 Tow Truck operator in all cases when answering a call for record purposes.

Method of Measurement:

The quantity of “Class 2 Tow Truck” will be measured as the number of service calls placed and completed.

Basis of Payment:

The quantity of "Class 2 Tow Truck" will be paid for at the Contract unit price per Each service call. Price and payment shall be full compensation for furnishing all labor, materials, and equipment; assistance to motorists and delivery of vehicles to the designated drop-off location; for all tools, equipment, labor, and all necessary incidentals to complete the work.

3/13/15

807501 - TRAFFIC SEPARATOR

Description:

This work consists of furnishing and installing traffic separator as shown on the Plans and in accordance with these Special Provisions, notes on the Plans, and as directed by the Engineer.

Materials and Construction Methods:

Provide one of the following traffic separator: Dura-Curb by Impact Recovery Systems, Tuff Curb by Impact Recovery Systems, Qwik Kurb by Qwik Kurb Inc., or an approved equal.

Install the traffic separator in locations shown on plans. Install the traffic separator and required vertical panels in accordance to manufacturer's recommendation.

The vertical panels shall be white in color and shall have a minimum height of 35". The spacing of the vertical panels shall be spaced consistently between 36" to 60".

Method of Measurement:

The quantity of traffic separator will be measured as the actual number of linear feet (linear meters) of traffic separator being installed or replaced.

Basis of Payment:

The quantity of traffic separator will be paid for at the Contract unit price per linear foot (linear meter). Price and payment will constitute full compensation for installing, furnishing all required materials, disposal, labor, equipment, tools, and incidentals. The removal of the traffic separator will be incidental to the installation.

12/8/17

807502 - REPLACE VERTICAL PANEL TRAFFIC SEPARATOR

Description:

This work consists of furnishing and installing the vertical panels to replaced damaged vertical panels for the traffic separator in accordance with these Special Provisions, notes on the Plans, and as directed by the Engineer.

Materials and Construction Methods:

Remove and replace the damaged vertical panel of the traffic separator in accordance with the manufacturer's recommendations as directed.

Install the traffic separator and required vertical panels in accordance to manufacturer's recommendation.

The vertical panels shall be white in color and shall have a minimum height of 35". The spacing of the vertical panels shall be spaced consistently between 36" to 60".

Method of Measurement:

The quantity of replaced vertical panels will be measured as the actual number of vertical panels per each being replaced.

Basis of Payment:

The quantity of replaced vertical panels will be measured as the actual number of vertical panels per each being replaced. Price and payment will constitute full compensation for installing, furnishing all required materials, disposal, labor, equipment, tools, and incidentals. The removal of the vertical panel will be incidental.

10/5/2018

813500 – PEDESTRIAN CHANNELIZING BARRICADE SYSTEM

Description:

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

Materials:

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

A. *Barricade Rails:*

1. Manufactured from high density polyethylene (HDPE) with UV inhibitors.
2. Barricade rails must accommodate a minimum of 7 3/4" wide retroreflective sheeting on both sides of the rails.
 - a. Use white prismatic and fluorescent orange retroreflective sheeting where the white and fluorescent orange colors are placed at 45-degree angles.

B. *Barricade supports:*

1. Manufactured from high density polyethylene (HDPE) with UV inhibitors and internally ballasted.
 - a. Use ballast material in accordance with manufacturer recommendations.

Construction Methods:

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

- A. Assemble the barricade without hardware and in accordance with manufacturer's recommendations.
- B. Provide continuous upper and lower rails for hand or cane trailing.
 1. Install upper rail of barricade a minimum 36" above the ground, measured from the ground to the top of the upper rail.
 2. Install lower rail of the barricade a minimum of 1 1/2" above the ground, measured from the ground to the bottom of the lower rail.
- C. No portion of the barrier structure or supports may extend into the walkway more than 3/4" further than the common plane formed by the upper and lower rails.
- D. Ensure that barricade joints are smooth and snag-resistant to accommodate safe hand trailing.
- E. Provide accommodations for attachment of audible information devices.
- F. Pedestrian channelizing barricades cannot be used as road closure barricades or provide positive protection between the temporary walkway and vehicular traffic.
- G. Remove pedestrian channelizing when it is no longer needed.
 1. Dispose of all materials in accordance with Subsection 106.08

Method of Measurement:

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

Basis of Payment:

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

5/17/17

- 831500 - FURNISH AND INSTALL UP TO 6" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831501 - FURNISH AND INSTALL 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831502 - FURNISH AND INSTALL 3" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831503 - FURNISH AND INSTALL 2-1/2" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831504 - FURNISH AND INSTALL 2" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831505 - FURNISH AND INSTALL 1" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831506 - FURNISH AND INSTALL 1" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
- 831507 - FURNISH AND INSTALL 2" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
- 831508 - FURNISH AND INSTALL 3" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
- 831509 - FURNISH AND INSTALL 4" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
- 831512 - FURNISH AND INSTALL 1" SCHEDULE 80 PVC CONDUIT (TRENCH)
- 831513 - FURNISH AND INSTALL 2" SCHEDULE 80 PVC CONDUIT (TRENCH)
- 831514 - FURNISH AND INSTALL 2-1/2" SCHEDULE 80 PVC CONDUIT (TRENCH)
- 831515 - FURNISH AND INSTALL 3" SCHEDULE 80 PVC CONDUIT (TRENCH)
- 831516 - FURNISH AND INSTALL 4" SCHEDULE 80 PVC CONDUIT (TRENCH)
- 831517 - FURNISH AND INSTALL 1" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
- 831518 - FURNISH AND INSTALL 2" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
- 831519 - FURNISH AND INSTALL 2-1/2" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
- 831520 - FURNISH AND INSTALL 3" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
- 831521 - FURNISH AND INSTALL 4" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
- 831522 - FURNISH AND INSTALL 1" GALVANIZED STEEL CONDUIT (TRENCH)
- 831523 - FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (TRENCH)
- 831524 - FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (TRENCH)
- 831525 - FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (TRENCH)
- 831526 - FURNISH AND INSTALL 4" GALVANIZED STEEL CONDUIT (TRENCH)
- 831527 - FURNISH AND INSTALL 1" GALVANIZED STEEL CONDUIT (BORE)
- 831528 - FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (BORE)
- 831529 - FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (BORE)
- 831530 - FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (BORE)
- 831531 - FURNISH AND INSTALL 4" GALVANIZED STEEL CONDUIT (BORE)
- 831532 - FURNISH AND INSTALL 1" GALVANIZED STEEL CONDUIT (OPEN CUT)
- 831533 - FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (OPEN CUT)
- 831534 - FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (OPEN CUT)
- 831535 - FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (OPEN CUT)
- 831536 - FURNISH AND INSTALL 4" GALVANIZED STEEL CONDUIT (OPEN CUT)
- 831537 - FURNISH AND INSTALL 1" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
- 831538 - FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
- 831539 - FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
- 831540 - FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
- 831541 - FURNISH AND INSTALL 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
- 831542 - FURNISH AND INSTALL 2" HDPE SDR-13.5 CONDUIT (BORE)
- 831543 - FURNISH AND INSTALL 2-1/2" HDPE SDR-13.5 CONDUIT (BORE)
- 831544 - FURNISH AND INSTALL 3" HDPE SDR-13.5 CONDUIT (BORE)
- 831545 - FURNISH AND INSTALL 4" HDPE SDR-13.5 CONDUIT (BORE)
- 831560 - FURNISH AND INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
- 831561 - FURNISH AND INSTALL 1-1/2" SCHEDULE 80 PVC CONDUIT (TRENCH)
- 831562 - FURNISH AND INSTALL 1-1/2" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
- 831563 - FURNISH AND INSTALL 1-1/2" GALVANIZED STEEL CONDUIT (OPEN CUT)
- 831564 - FURNISH AND INSTALL 1-1/2" GALVANIZED STEEL CONDUIT (TRENCH)
- 831565 - FURNISH AND INSTALL 1-1/2" GALVANIZED STEEL CONDUIT (BORE)
- 831566 - FURNISH AND INSTALL 1-1/2" GALVANIZED STEEL CONDUIT (ON STRUCTURE)

- 831569 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 1" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT
- 831570 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 1-1/2" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT
- 831571 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT
- 831572 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2-1/2" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT
- 831573 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 3" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT

- 831574 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 4" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT
- 831575 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2" HDPE 13.5 SDR CONDUIT IN DIRECTIONAL BORE
- 831576 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2-1/2" HDPE 13.5 SDR CONDUIT IN DIRECTIONAL BORE
- 831577 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 3" HDPE 13.5 SDR CONDUIT IN DIRECTIONAL BORE
- 831578 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 4" HDPE 13.5 SDR CONDUIT IN DIRECTIONAL BORE
- 831579 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 1" GALVANIZED STEEL CONDUIT IN TRENCH OR OPEN CUT
- 831580 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 1-1/2" GALVANIZED STEEL CONDUIT IN TRENCH OR OPEN CUT
- 831581 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2" GALVANIZED STEEL CONDUIT IN TRENCH OR OPEN CUT
- 831582 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2-1/2" GALVANIZED STEEL CONDUIT IN TRENCH OR OPEN CUT
- 831583 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 3" GALVANIZED STEEL CONDUIT IN TRENCH OR OPEN CUT
- 831584 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 4" GALVANIZED STEEL CONDUIT IN TRENCH OR OPEN CUT
- 831585 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 1" STEEL CONDUIT IN DIRECTIONAL BORE
- 831586 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 1-1/2" STEEL CONDUIT IN DIRECTIONAL BORE
- 831587 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2" STEEL CONDUIT IN DIRECTIONAL BORE
- 831588 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2-1/2" STEEL CONDUIT IN DIRECTIONAL BORE
- 831589 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 3" STEEL CONDUIT IN DIRECTIONAL BORE
- 831590 - FURNISH & INSTALL SECOND AND SUBSEQUENT ADDITIONAL 4" STEEL CONDUIT IN DIRECTIONAL BORE

Description:

This work consists of furnishing and installing a conduit or shield, of the type and size required and as specified in the contract documents or as directed by the Engineer.

Materials:

All conduits shall be UL listed.

HDPE Conduit - 2" and 4" diameter, high density polyethylene (HDPE) SDR-13.5, smooth wall conduit with permanently pre-lubricated lining, meeting ASTM D2447, ASTM D3035 and NEMA TC7 specifications.

PVC Conduit - 4", 3", 2-1/2", 2" or 1" diameter, schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

Galvanized Steel Conduit - 4", 3", 2-1/2", 2", 1-1/2" or 1" diameter, rigid galvanized steel conduit meeting National Electric Code 2002, Article 344.

HDPE Conduit to PVC Conduit Coupling - Galvanized steel meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications

Flexible Metallic-Liquidtight Conduit - meets National Electric Code 2002, Article 350

Weatherhead for galvanized or PVC conduit - material shall match the adjoining conduit

Insulated grounding bushing with knockouts - meet or exceed UL 514 B

Condulets for conduit sizes - material shall match the adjoining conduit

Anchors - A 307, Galvanized per A 153

One hole conduit hangers - Steel City Series 6H or 6H-B, CADDY CD3B Rigid Conduit Hanger, or approved equal

End caps - material shall match the adjoining conduit

LONG sweep sections for conduit sizes - material shall match the adjoining conduit, and shall be manufactured 90 degree sweeping bends.

Construction Methods:

General Installation Requirements -

The Department has the right to reject any installation method proposed for a given work site. PVC shall not be installed under existing pavement unless it is on a continuous roll or with the Engineer's written approval.

Conduit installed underground shall be installed in a straight line between terminal points. In straight runs, junction well spacing shall be no more than 600 feet for fiber optic conduit or no more than 300 feet for copper in conduit, or as directed by the Engineer. If bends are required during installation, they must be manufactured sweeping bends. The Engineer will be consulted before any bends are installed to ensure that the proper arc is provided.

Underground conduit shall have a minimum cover as measured from the finished grade of 24 inches and a maximum cover of 48 inches. The opening shall be filled half way with the cover material, and tamped down firmly before filling in the remainder of the opening. Additional lifts shall be used as required to install the metallic warning tape at the specified depth. All cover material shall be free of rocks, debris, vegetation or other deleterious material that may damage the conduit. An underground utility warning tape shall be installed as specified in this section and the remainder of the fill shall be added, tamping down the top layer.

Conduit not terminated to a base or in a junction well shall be terminated 2 feet beyond the edge of the pavement unless otherwise directed by the Engineer, and properly capped. Tape is NOT an approved method. Conduit shall not extend more than 3 inches inside a junction well. See Standard Construction Details or applicable Plan Details for typical methods of termination.

All underground conduits shall be marked in the ground with a metallic warning tape. The marking tape shall be buried directly above the conduit run that it identifies, at a depth of approximately 12 inches below final grade. The tape identifying ALL conduits shall be at least 6 inches wide, and have a minimum thickness of 3 mils and 500 percent elongation.

The color of the metallic warning tape identifying fiber optic cable should be bright orange (preferably AULCC orange), and shall read "WARNING - OPTICAL CABLE" or other wording approved by the Engineer that conveys the same message. The color of the tape identifying all other cables shall be bright red, and shall read "WARNING -BURIED ELECTRIC BELOW" or other wording approved by the Engineer that conveys the same message.

Using conduit tools, rigid metallic conduit shall be cut, reamed, and threaded. The thread length shall be as necessary to ensure that the sections of conduits when screwed into a coupling and tightened correctly will butt together and the joint will be watertight. A three-piece threaded union, as approved by the Engineer, shall be used to join two threaded lengths of conduit in the case where a standard coupling will not work. A threaded union shall not be used in a conduit run that is to be driven. At no time is a threadless coupling or a split-bolt coupling to be used for direct buried conduit.

All lengths of HDPE conduit shall be connected with irreversible fusion couplings. Mechanical and removable couplings will not be accepted.

All lengths of PVC conduit shall be connected by one conduit end fitting inside the flared end of the other conduit section. If this is not possible, then a coupling may be used. Regardless of how connection is made, all joints shall be sealed with the appropriate epoxy to ensure that the two conduit pieces bond to one another to form a solid waterproof link. Using conduit tools, the conduit shall be cut and prepared. If approved by the Engineer, a coupler module may be used where conduit segments do not align properly to allow the flared end of one conduit segment to mate with the normal end of the other segment.

Sealed end caps (with knockouts if empty) shall be placed on the ends of all conduits, after compressed air has been used to clear all foreign matter.

If not already pre-installed by the manufacturer, a polyester or polypropylene pulling rope or tape (fish wire) with a minimum rated strength of 1250 pounds shall be installed in each conduit for future use. In instances where the Contractor installs the cable, the fish wire may be eliminated.

All PVC and HDPE conduits shall have a continuous metallic trace wire installed for the entire length of the conduit run for all fiber installations.

Generally, Item No. 908020 - Erosion Control Blanket Mulch in the Department's 2016 Standard Specifications would be used to stabilize slopes that are 2:1 or flatter. For slopes that are steeper than 2:1 and/or receive a moderate amount of concentrated flow, Item No. 908021 - Turf Reinforcement Matting, Type 1 in the Department's 2016 Standard Specifications would be used for slope stabilization. However, if required Contractor shall refer to DelDOT's Erosion and Sediment Control Manual for the placement of steep slope stabilization.

Installation of Conduit Under Existing Pavement, Directional Bore -

Directional bore shall be used for installation of conduits under existing pavement with a conduit diameter not less than 1-1/2". The size of a bore shall not exceed the outside diameter of the conduit by more than 1 inch. If it does, cement grout shall be pumped into the void. Only HDPE and/or Galvanized Steel conduit may be installed by Directional Bore methods.

Installation of Conduit Under Existing Pavement, Open Cut -

Installation by sawcutting the full pavement depth and removing the existing pavement with an excavator or by hand methods, shall be used only for conduits not less than 1-1/2" diameter. The Engineer must first approve all open cutting of roadways. The width and length of open cut and patch restoration materials shall be as shown on the plan details. The Contractor shall be responsible for the removal of all cut pavement and surplus excavation, and for the replacement and correction of any damaged pavement outside the sawcut limits after the conduit(s) are installed. Asphalt pavement, concrete, base course, sawcutting, and/or borrow from an outside source as required to restore the roadway will be paid for separately under their respective bid items.

Installation of Conduit Under Existing Pavement, Unpaved Trench -

Trenching or other approved method shall be used for installation of conduit in unpaved trench or under new pavement. Backfill in conduit trenches shall be compacted thoroughly as it is being placed. At the discretion of the Engineer, sod, that must be removed for the placement of conduit, shall be removed either by the use of an approved sod cutter and then replaced, or 6 inches of topsoil shall be placed and the surface seeded in accordance with Section 734001 - Seeding. In areas where new pavement is to be placed or in areas where total reconstruction is taking place, sodding or seeding may not be required by the Engineer. Sodding and/or topsoil from an outside source if required will be paid for separately under their respective bid items. Seeding is considered incidental to the conduit item.

Installation of Conduit on Structure -

Conduit installed on structure shall consist of drilling anchors into concrete, brick, stone, steel or wood and mounting the conduit with the proper clamps or hangers. The conduit shall be attached to the structure by use of one-hole conduit hangers and approved anchors not more than 36 inches apart. Any 90-degree turns in the conduit run shall be accomplished by placing the proper size and type manufactured sweeping bends for the application needed.

Installation of Additional Conduit in Trench or Open Cut Pavement:

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

Installation of Additional Conduits in Directional Bore:

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

Method of Measurement:

The quantity of conduit furnished and installed as specified, shall be measured as the number of linear feet of conduit furnished, installed as specified, complete in place, and accepted.

The length of each conduit installed under existing pavement by a directional bore or by open cutting the pavement shall be measured along the path of the bore or open cut, from the point that cannot be trenched to the point that trenching can resume.

The length of any conduit that is reduced or divided (with a junction well or conduit body) shall be measured as part of the larger conduit.

Basis of Payment:

The quantity of conduit will be paid for at the Contract unit price per linear foot. Price and payment shall include full compensation for all materials, and labor, topsoil and seed if needed, and incidentals necessary to complete the item. Payment for all necessary couplings shall be incidental to the price of the conduit.

For conduit installed by Directional Bore, the linear foot payment also includes excavation and backfilling for Bore Equipment, placing the conduit, caps if required, and all other requirements and incidentals listed in the body of this specification.

For conduit installed by Open Cutting existing pavement, the linear foot payment also includes excavating, backfilling, placing the conduit, disposal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For conduit installed in an Unpaved Trench, the linear foot payment also includes excavating, removal of sod if required, backfilling, placing the conduit, disposal of excess materials, replacing excavated on-site sod if required, seeding if required, and all other requirements and incidentals listed in the body of this specification. Sod and/or topsoil furnished from an outside source, will be paid for separately.

For conduit installed on a structure, the linear foot payment also includes furnishing and installing anchors and hangers, removal of excess materials, and all other requirements and incidentals listed in the body of this specification.

4/12/2018

835500 - FURNISH & INSTALL ADDITIONAL DISCONNECT SWITCH

Description:

This work consists of furnishing an additional disconnect switch, aluminum panel, square sign posts and tubing, condulets and accessories, and all hardware necessary for mounting the disconnect switch to the aluminum panel, and the aluminum panel to the sign post assembly per the standard construction details. Where required, provide all hardware for attaching the disconnect switch to a cabinet, utility pole, wood post, or other structure per applicable plan details. The disconnect switch shall be NEMA standard KS 1-latest edition. The disconnect switch enclosure shall be Type 4 stainless steel, with external operating handle, enclosure cover interlock, and external switch mechanism handle with provisions for securing in both the ON and OFF positions by padlock. The switch mechanism shall be of heavy duty design with quick make, quick break type operations and visible blades.

The disconnect switch shall be fusible with integral fuse puller on the line side. The disconnect switch on the load side shall be non-fusible. Single phase disconnect switches shall have 2 poles with solid neutral and shall be rated at 240 Volts. Three phase disconnect switches shall have 3 poles with solid neutral and shall be rated at 600 Volts. The design of the neutral bar may be factory or field installable.

For traffic signals, intersection control beacons, and intersection lighting operating at 120 Volts, single phase 60 amps (fused 35 amps) for disconnect fuse-holders will be used. For hazard identification beacons and luminaires mounted on traffic signal structures operating at 120 Volts, single phase 30 amps (fused 20 amps) for disconnect fuse-holders will be used.

Disconnect switches for lighting control cabinets shall be equipped with the same number of poles and amperage rating specified in the electrical service equipment item. Disconnect switches for electrical service distribution cabinets shall be equipped with 200-amp, 2 pole and single phase.

Construction Methods:

The disconnect switch shall be installed per the standard construction or applicable plan details.

Measurement and Payment:

The disconnect switch will be measured and paid for at the contract unit price per each supplied at the phasing and amperage specified and installed. The payment will be full compensation for the disconnect switch, ground rods, wiring, conduit risers, elbows, conduit nipples and adapters, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

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

4/17/2018

842501 - FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240 (100 AMP)

842502 - FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240 (200 AMP)

Description:

This work is comprised of furnishing and installing Traffic Signals, ITS Devices and Lighting service pedestals and safety switches in accordance with the Contract Documents and as directed by the Engineer. Electrical service equipment consists of the equipment necessary to connect a utility company service to a traffic signal or ITS device controller cabinet, traffic monitoring station cabinet, or other traffic control device cabinet or lighting control cabinet. Provide electrical service equipment at the phasing and amperage specified in the Contract Documents. This work includes coordinating the connection with the local utility company. While the 100 Amp Service may be specified for both Traffic and Highway Lighting, the 200 Amp Service is typically specified for Highway Lighting Only.

Materials:

- Service Pedestal and safety switch
- Ground Rod & Wire
- Cables and wire (including three #8 THHN, one red, one black and one white)
- Conduit & Fittings, Galvanized Steel
- Hex Bolts & Washers, Stainless Steel
- Square Tube Steel Posts
- Portland Cement Concrete, Class B
- Galvanizing
- Aluminum Pedestal Board/Panel
- 24" x 30" Minimum Size Circuit Breaker Box (To be determined by serviceable needs)

All materials provided shall be in accordance with the applicable sections of the Department's 2016 Standard Specifications

Construction Methods:

All work shall be performed in compliance with NEC, NFPA, and NESC Standards and with utility company minimum requirements. The electric service pedestal shall be installed as shown in the Contract Document Details. The contractor shall locate line side safety switch and meter adjacent to service drop location, fuse and size line side safety switch to service. The load side safety switch should not be fused. Safety switch should be marked with weatherproof stamp. Switch should be labeled "Signal", "Camera", "Repeater", "VMS", "Detector" "RWIS" or "Lighting", denoting the device it serves. All conduits and hardware connections should be tightened with the appropriate wrenches or tools.

The ground resistance of each rod must be measured before connecting the rod to the grounding conductor. If the measured resistance exceeds 25 ohms, exothermically weld a 10-ft. extension to the top of the first rod and drive to its full depth. Measure the earth resistance again. If it still exceeds 25 ohms, contact the engineer for instruction.

Service Pedestal Installation

Area for service pedestal should be excavated. Where a pole base is to be placed in existing concrete pavement such as a sidewalk, the concrete should be saw cut in a square pattern or be removed to the nearest joint. Install conduit using a conduit adapter to connect sweeps to underground conduit and conduit leading to the safety switch and meter. An appropriate length of 2-inch galvanized conduit (threaded and reamed on both ends) should be installed on the end of the 90 degree sweeps at the base of the pedestal so that the end of the conduit will be 3 feet above the finished grade of the area.

Install square tube steel posts per Contract Document Details in 12-inch X 12-inch X 36-inch concrete footings. 3-Inch clearance should be provided on the base of footing. Backfill around the conduit and concrete footings and dispose of excess or unsuitable materials to grade of the bottom of concrete footings. Backfill may be placed after the first 24 hours. Backfill should be as provided in the contract documents.

Remove all excess material. Suitable Material may be used elsewhere on the Project as directed by the Engineer. Set square tube steel posts and determine the finished length of the tubular steel posts by adding the total height of the meter and safety switch to 5 feet. Install ground rod in accordance with the contract documents. The ground resistance of each rod must be measured before connecting the rod to the grounding conductor. If the measured resistance exceeds 25 ohms, exothermically weld a 10-ft. extension to the top of the first rod and drive to its full depth. Measure the earth resistance again. If it still exceeds 25 ohms, contact the engineer for instruction.

Attach pedestal aluminum board/panel to square tube steel posts using six (three for each post) 5/16" x2-1/2" long Grade 5 stainless steel hex bolts, flat washers and nylon lock nuts. Attach meter socket to the board/panel with four 5/16" x 3/4" stainless steel hex bolts and nylon lock nuts. Attach the circuit breaker box to the board/panel with four 5/16" x 3/4" stainless steel hex bolts and nylon lock nuts.

The contractor shall arrange inspection by a Delaware licensed electrical inspection agency or contractor's licensed staff) for all lighting system work including but not limited to service, branch circuits, junction wells, underground conduit, all grounding and bonding and any electrical work performed on the project. The contractor shall submit certification for the chosen Delaware licensed electrical inspection agency or contractor's staff to the Project Engineer for approval prior to starting work.

Method of Measurement:

The quantity of electric services will be measured as the actual number of complete electric services installed, complete in place tested and accepted.

Basis of Payment:

The quantity of electric services installed will be paid at the Contract Unit Price per each electric service of the size and type specified, installed, complete in place, tested and accepted. Price and payment constitutes full compensation for all materials, including all enclosures, panel boards, ground rods, circuit breakers, internal wiring, wiring devices, wiring up to 10 feet each underground from the service pedestal to the utility pole and up to 50 feet each vertical (up the service pedestal and up the utility pole combined and including all required coils), concrete collar, meter sockets, meter, shunts, cover plates, wiring, square tubing, back panel and for all labor, tools, inspection by Delaware licensed electrical agency, and incidentals necessary to complete the Item as specified and as directed by the Engineer.

4/17/2018

850522 - LED Luminaire: 400 Watt HPS Equivalent

Description:

This work consists of furnishing and installing an LED light fixture on poles, in accordance with these specifications and as shown on the Plans.

Materials:

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

The fixture shall also meet the following criteria:

1. Lamps: LED
2. Wattage: 250 Watt Maximum
3. Voltage: 120V - 277V
4. CRI: 70 Minimum
5. Lumens: 27,000 to 31,000
6. Rated L70 Lamp Life: 100,000 Hours Minimum when operated at 25 Degrees C (77 Degrees F)
7. Distribution: Type II or Type III (unless otherwise indicated)
8. Color Temperature: 3,000 K - 4,000 K
9. Drive Current: 1050mA Maximum
10. Driver: 0-10V Dimming
11. IP66 Rating for optical portion of the housing
12. 10kV/10kA minimum internal surge suppression module, meeting UL 1449/ANSI C62.41.2 Category C
13. 3 Pin or 7 Pin NEMA Photocontrol Receptacle with a Shorting Cap.

Luminaire mounting height shall be as indicated on drawings.

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

Point 1 coordinates are 90 feet longitudinal distance. Point 2 coordinates are 90 feet longitudinal and 30 feet transverse. The point values given in the table are based on a 30 foot mounting height with a Light Loss Factor of 1. The point values produced by the submitted fixture shall be included with the fixture submittal.

Foot-candle Point Table	
Point 1	Point 2
0.46	0.55

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

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

1. CCT and CRI for all luminaires

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

The following installation requirements shall be followed:

1. Comply with NECA 1.

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

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

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

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

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

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

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

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

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

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

Warranty:

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

Method of Measurement:

The quantity of LED Light Fixtures will be measured as the actual number of luminaires provided complete in place and accepted.

Basis of Payment:

The quantity of LED Light Fixtures will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the item installation.

1/28/19

850523 - Luminaire (LED), 640 Watts, HPS Equivalent (High Mast Only)

Description:

This work consists of furnishing and installing an LED high mast light fixture, in accordance with these specifications and as shown on the Plans.

Materials:

The complete fixture shall have a heavy-duty, cast-aluminum housing, with stainless steel or zinc plated steel fastening hardware. The fixture shall meet ANSI 136.31 3.0 G vibration requirements. Fixture shall have a minimum of two-bolt slip fitter system for mounting on a 1-1/4 inch to 2-3/8 inch mounting arm connection. A grey powder coat finish shall be applied to the fixture unless otherwise shown on the plans, or as directed by the engineer. Fixture shall have factory installed LED array and anodized aluminum heat sink with no moving parts.

1. Lamps: LED
2. Wattage: 640 Watt Maximum
3. Voltage: 120V - 277V
4. CRI: 70 Minimum
5. Lumens: 64,000 Minimum
6. Rated L70 Lamp Life: 100,000 Hours Minimum when operated at 25 Degrees C (77 Degrees F)
7. Distribution: Type IV or V (as indicated on contract drawings)
8. Color Temperature: 3,000K - 4,000K
9. Drive Current: 1050mA Maximum
10. Driver: 0-10V Dimming
11. BUG Rating: Uplight Rating of '0'
12. IP66 Rating for optical portion of the housing
13. 10kV/10kA minimum internal surge suppression module, meeting UL 1449/ANSI C62.41.2 Category C
14. 3 or 7 Pin NEMA Photocontrol Receptacle with a Shorting Cap.

Luminaire mounting height shall be as indicated on drawings.

Shielding for luminaire shall be as indicated on drawings, as necessary.

Maximum EPA of fixtures shall be coordinated to be within the acceptable limits of the mounting ring and pole.

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

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

1. "Use Only" and include specific lamp type
2. CCT and CRI for all luminaires

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

The following installation requirements shall be followed:

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

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

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

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

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

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

If Contract Documents require each light fixture to be provided with an independent photoelectric control device, a photocell shall be provided with each lighting fixture in place of the shorting cap. Provide photoelectric control using solid state circuitry, cadmium sulfide type with hermetically sealed silicone rectifier rated 120-277 volt, 60 cycle AC and 1000 watts maximum load. Photoelectric control shall be provided with "Fail On" functionality such that in the event of a photocell becoming inoperative, the light fixture will remain in a permanent "On" state through day and nighttime hours. Photo control shall be twist lock type, with suitable mounting bracket with locking type receptacle.

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

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

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

Warranty:

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

Method of Measurement:

The quantity of LED High Mast Fixtures will be measured as the actual number of luminaires provided complete in place and accepted.

Basis of Payment:

The quantity of LED Light Fixtures will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the item installation.

3/27/2019

851531 - HIGH MAST LIGHTING POLE

Description:

High mast lighting structures shall be designed in accordance with the 2013 American Association of State Highway and Transportation Officials (AASHTO) "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" 6th edition with 2015 interims. High mast lighting structures shall be designed for a 100 mph wind plus 30 percent gust factor and shall comply with fatigue category 1, (in accordance with Appendix C). In addition, high mast lighting structures shall have a maximum fatigue combined stress ratio (CSR) of 0.9.

The pole manufacturer shall furnish the Engineer with certified inspection reports. The manufacturer shall maintain a "Traveler" on all major components. The "Traveler" will list material identification, welder identity, test results, and inspector identity.

Pole drawings and calculations shall be provided and signed and sealed by a state of Delaware registered Professional Engineer. The Contractor shall provide a certificate of compliance to prove that all products meet or exceed the specified ASTM and AASHTO requirements. All standards (poles) shall require approval by the Engineer. Maximum loads used to design the proposed foundations are listed below. The pole manufacturer shall provide high mast light poles that do not exceed these loads at the base of the pole. Should the manufacturer provide a pole with forces at the base of the pole exceeding the foundation design loads listed below, the proposed foundations will need to be reanalyzed.

Axial Force = 10.0 kips
Shear Force = 6.0 kips
Moment = 410.0 k-ft

Materials & Construction Methods:

High mast lighting structures shall be poles assembled using sections with telescoping joints. Poles shall be round tapered steel fabricated from high strength low alloy steel conforming to ASTM A572 or A595, minimum yield strength of 55,000 psi. Higher yield strengths may be used, but 55,000 psi shall be utilized for all calculations.

- (a) 90' poles = at least 2 section but no more than 3 sections.
- (b) 100' poles = at least 3 sections but no more than 4 sections.
- (c) 120' pole = at least 3 sections but no more than 4 sections.

The bottom section of each pole shall be sized 2 gauges higher than code requirements to increase the service life of the poles.

Poles shall have a minimum diameter of 6 inches O.D. at top. The pole shall have a uniform taper from top to bottom.

Poles shall be hot-dipped galvanized per ASTM A 123.

All welding shall be performed by welding operators certified using the procedures from the latest edition of the American Welding Society Structural Welding Code, AWS D1.1-84.

- (a) All welding shall be done by the shielded metal-arc, gas shielded flux core, gas metal arc, or submerged-arc process.
- (b) There shall be a maximum of one longitudinal weld in the tapered sections of the shaft, which shall be made by automatic seam welding.
- (c) The longitudinal weld seams shall have at least 60% penetration, except in the areas where the shaft section telescopes over another section. In overlapped areas, the weld penetration shall be 100%. No transverse butt welds will be acceptable in fabricating the shaft sections.
- (d) Longitudinal seams within 6 inches of a slip joint area shall be complete penetration welds.

- (e) Base plate, circumferential weld joining base plate, and bottom tube sections shall be complete penetration welds.
- (f) The female tube ends in the area of overlapping joints shall be welded with full penetration butt weld, AWS D1.1-84, B-L1b or B-L1a-S and shall be ground smooth.
- (g) Weld quality shall conform to AWS D1.1 Section 8. Records of welding procedure and welding operator test results shall be kept by the supplier and shall be available for review by the Engineer.
 - 1. All welds shall be examined visually to insure compliance with the quality requirements.
 - 2. Fillet welds shall be examined by magnetic particle inspection at a rate of 1' per 5' or portion thereof, of each size and location.
- (h) All fillet welds for stiffener plates to be built up to obtain full throat thickness.
- (i) All full penetration butt welds shall be made with steel backing in strict accordance with AWS specifications. Steel backing shall be continuous for the full length of the weld and any necessary welds in the backing shall be full penetration butt welds, ground smooth.

Maximum shaft deflection at top of the pole to be 8 percent of the pole length due to wind loading.

Identification Markers

Each high mast standard shall be provided with an identification marker fabricated from 1/16" thick, clear anodized aluminum formed to fit the standard, with rounded edges and corners. Markers shall be secured with four 1/8" diameter, 18-8 stainless steel, round head drive screws or self-tapping screws.

Markers shall be mounted 6 feet above the pole base and on the pole quadrant facing oncoming traffic. Provide two markers, one for both northbound and southbound, for poles located in medians.

Base Plates

Base plates and other miscellaneous parts shall be fabricated from ASTM A 572 having minimum yield strength of 50,000 psi.

Handholes

Handholes shall be 10" wide x 30" tall, reinforced and fabricated from the same grade steel as the pole shaft. The opening shall be sized to permit operation and maintenance of raising and lowering mechanism as well as ready access to electrical installation and connections. The design and details for the handhole reinforcement shall be submitted to the engineer for approval prior to ordering and fabrication.

A steel winch mounting plate shall be welded inside the pole shaft, opposite the handhole.

A steel plate shall be welded to the top of the pole for the purpose of directly bolting the lowering device unit head-frame to the pole. Attachment of the head-frame shall be made by lock-nut and bolt (set screws are prohibited).

A hinged door with a hasp for a padlock shall be provided. The hinge shall be attached to the pole with two (2) 5/8" diameter high strength bolts.

Anchor Bolts

Anchor bolts shall conform to ASTM F 1554, grade 55,000 psi.

Anchor bolts shall be hot-dipped galvanized per ASTM A 153 for at least twice the length of the threads, including the threaded end.

Anchor bolt nuts and washers shall conform to ASTM A 563 Gr DH. All washers shall be heavy washers per F 436.

Head-Frame Assembly

Attach, to the top of each high mast pole, a head-frame assembly designed to support the luminaire ring with its required number of luminaries, in addition to the cable pulleys and mechanisms.

Mount pulleys and mechanisms on the head-frame assembly; cover with a protective non-corrodible housing.

Make necessary cable openings as small as practicable to prevent bird entry.

Provide a housing that can easily be removed from the head-frame assembly for servicing of pulleys and other mechanisms.

Provide a 24 inch (minimum), nickel-tip, copper lightning rod on each pole, extending at least 20 inches above the head-frame cover and located on, or near, the pole centerline. Ground lightning rod to pole top using #1/0 braided copper using adapters, cable connectors, and grounding lug designed for such purpose. Mount the lightning rod with brass or bronze hardware.

Provide pulleys large enough to contain the various required cables, without exceeding the manufacture or other required bending radii.

Fabricate pulleys of either cast steel with nylon bushing or aluminum with a bronze bushing. Pulleys shall have a type 304 stainless steel shaft. Pulleys shall be equipped with guards to prevent the cable from jumping off the pulley.

Furnish a head-frame that provides three point suspension and positive centering and engagement between the mating parts of the head-frame and the luminaire ring assembly.

Hot-dip galvanize the head-frame, after fabrication, in accordance with ASTM A 123 or completely zinc-electroplate with an additional 5 mil minimum coating of approved zinc-rich epoxy powder coating.

Latching

Furnish each high mast pole assembly with a bottom latching device. At least two latching cables shall be used to lock the luminaire ring into place.

A visual indicator at each cable attachment shall be provided to verify that the luminaire ring is in the fully raised position.

Luminaire Ring Assembly

Equally space 2-inch luminaire tenons, 6 inches long, around the ring for the number of luminaries required.

Hot-dip galvanize the entire luminaire ring assembly after fabrication in accordance with ASTM A 123.

Provide a weatherproof male plug wired to the terminal box for energizing the luminaries in the lowered/servicing position.

Provide a 30 ampere, four wire type plug to mate with the power receptacle.

Provide an enclosure on the ring, in accordance with section 950.13.07, to house the terminal block, fuse block, and lightning arrester. Enclosure shall be rated NEMA 4.

Provide guide rollers or pads to cushion excess swing during raising and lowering operations.

The ring shall be capable of turning (or twisting) clockwise or counter-clockwise around the pole for servicing.

Winch Assembly

Provide a self-locking, permanently lubricated, worm gear winch assembly, enclosed within the pole mast, capable of raising and lowering the entire luminaire ring, with luminaires, at a minimum rate of 10 feet per minute, when driven by a portable electric winch drive.

Provide a drive unit of a size and speed determined by the load and required raising and lowering speed, without exceeding 50% of the capacity of the worm gear assembly or the drive unit.

Provide a winch that remains locked in any position so that the luminaire ring assembly cannot fall under its own weight if the operator interrupts the raising or lowering operations.

Provide a winch designed to assure proper spooling of the cable upon the drum at all times.

Hoist Cables

Furnish the size and length hoist cables required, made from stainless steel aircraft cable, meeting Military Specifications MIL-C-5424A-1. Attach support cables to a self-leveling yoke, to which is attached to the winch cable from the winch drum.

Provide guide cables or other acceptable means to prevent cable entanglements in the pole shaft.

Miscellaneous Hardware

Furnish and install miscellaneous hardware of stainless steel, ASTM A 167, type 304.

Electrical

Furnish and install a 30A - 3P - 480/277V Y circuit breaker, rated >24,000AIC. Install circuit breaker in base in handhole.

Furnish and install NEMA L22-30 locking receptacles and outlets for connection of loads, power winch, and loads when in servicing position.

Power cable shall be type SO, 5 conductor, 10AWG.

Luminaire feeds, from terminal board, shall be 3 conductor 14 AWG type SEO.

Electric Winch Drive

Drive shall be portable, heavy duty, industrial-rated, reversible, electrical drive system.

Provide a drive with a torque limiter that causes drive slippage at a predetermined torque load to prevent damage to cables, winch, or other portions of the lowering device system.

Provide sufficient length of cable and mating plug to directly utilize the power supply within the pole.

Equip the drive to attach to the winch drive shaft and the pole so the drive is completely self-supporting.

Furnish a drive that operates from a remote switch, with sufficient cable length so the operator can stand a safe distance outside the radius of the luminaire ring assembly.

The electric winch drive shall operate from 277V. A transformer may be used; however, no component of the electrical winch drive may exceed 50 pounds. The electric winch drive shall not be required to be disassembled into less than 5 components for storage.

The luminaire frame assembly shall be raised and lowered with a minimum speed of 10 feet per minute.

Method of Measurement:

The number of high mast lighting structures specified on the plans or as directed by the Engineer and constructed according to these specifications, complete in place and accepted, will be measured and paid for at the Contract unit price per each high mast lighting structure.

Basis of Payment:

The number of high mast lighting structures, as determined above, shall be paid for at the Contract unit price per each "High Mast Lighting Structure," which price and payment shall include the transportation and erection of the high mast lighting poles, luminaire assembly system, lowering assembly system, electrical system, all galvanized structural steel, bolts, and all labor, materials, equipment and incidentals necessary to construct the high mast lighting structure. All luminaires shall be paid under a separate item as part of this Contract. The excavation and construction of the concrete foundation shall be paid under a separate item as part of this Contract.

3/27/2019

905500 - SUPER SILT FENCE

Description:

This work consists of furnishing, installing, constructing, maintaining, and ultimately removing super silt filter fences as a temporary measure to control sedimentation within the limits of construction. Super silt fence shall be constructed as shown on the details in the Plans, at the locations shown on the Plans, and as directed by the Engineer.

Materials:

General. All materials shall be approved prior to use by the Department's Materials and Research Section.

Chain Link Fence. The construction requirements for the placement of the chain link fence shall be as specified in **SECTION 727 FENCES AND GATES** with the following exceptions:

- (a) Concrete footings (727.07), Top Rail, Tension Wire, Horizontal Braces shall not be used.

Fasteners. Aluminized steel tie wires long enough to securely attach the fabric to the posts.

Seed. Seed shall conform to the requirements of Section 908.

Mulch. Mulch shall conform to the requirements of Section 908.

Geotextile. Geotextile shall conform to the requirements of Section 1060. It shall be a minimum of 36" wide.

Construction Methods:

Construction of Super Silt Fence.

The Contractor shall excavate the trench along the upstream side of the post line as shown on Standard Construction Detail, Super Silt Fence. Posts shall be installed on the Downstream edge of the trench, along the established fence line. The geotextile shall be fastened to the upstream side of the chain link. The geotextile and chain link must extend a minimum of 33" above the ground. The chain link fabric and geotextile shall be embedded 8 inches into the excavated trench. The trench shall be backfilled and compacted over the chain link and geotextile to prevent water from flowing under the chain link and geotextile.

The super silt fence shall not be constructed across a ditch, or swale, or area of concentrated flow. On slopes, the terminal ends of super silt fence shall be turned upslope a sufficient distance to eliminate flow around the ends of the super silt fence. All geotextile damaged prior to installation, during installation, or during the life of the Contract shall be repaired or replaced to the satisfaction of the Engineer.

Maintenance of Super Silt Fence.

Throughout the Project construction period, the super silt fence shall be maintained by removing trapped sediment. The Contractor shall clean the geotextile of trapped sediment by tapping the geotextile when dry. No trash shall be allowed to accumulate to the height of the fence. Any geotextile that does not function due to clogging or deterioration shall be replaced.

Sediment Removal.

After every heavy rainfall, the Contractor shall check for excessive buildups of sediment which must be removed so that the super silt fence can continue to function as intended. Remove accumulated sediment when it reaches 50% of the height of the super silt fence.

Removal of Super Silt Fence.

The super silt fence shall be removed when the Engineer determines that it is no longer required. The super silt fence and all materials incidental to the super silt fence construction shall be removed. All areas affected by the construction of the super silt fence shall be restored to the original or plan contours and stabilized with seed and mulch.

Method of Measurement:

The quantity of super silt fence will be measured as the actual number of linear feet (linear meters) of super silt fence placed and accepted.

Basis of Payment:

The quantity of super silt fence will be paid for at the Contract unit price per linear foot for each type of fence. Price and payment will constitute full compensation for furnishing all materials; for excavating and backfilling associated with the construction of the super silt fence; for maintaining the super silt fence during the Project construction period; sediment removal, for removing the super silt fence with all related hardware after completion of the Project; for restoring the site; for seeding and mulching; and for all labor, equipment, tools and incidentals required to complete the work. No payment will be made for any replacement of or repairs to the super silt fence damaged prior to installation, during installation, or during the life of the Contract. No payment will be made for the replacement of the super silt fence.

3/05/2018



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

UTILITY STATEMENT
2/8/19
REVISED 3/1/19
State Contract No. T201109001
SR 141 Improvements, I-95 Interchange to Jay Drive
New Castle County

The following utility companies maintain facilities within the project limits:

Artesian Water Company
AT&T
Comcast Cable
Delmarva Power – Electric Distribution
Delmarva Power – Gas Distribution
Lightower
New Castle County Sewer
Verizon of DE
Zayo

The following is a breakdown of the utilities involved, adjustments and/or relocations as required (all stations, offsets, lengths and calendar days are approximate):

Artesian Water Company

NOTE: The Artesian Water Companies relocations shown outside the limit of construction on the Utility Relocation plans will be completed by Artesian forces prior to T201109001 construction beginning, Relocations shown inside the limit of construction will be completed by the state's contractor.

The Artesian Water Company maintains the following facilities within the project limits:

1. A 16" Cast Iron pipe running beneath the travel lanes of existing SB SR 141 beginning south of the project limits and enters the project limits at Sta. 1130+00, offset left 6' to approximate Sta. 1166+98.
 - a. A 3/4" copper service line that is currently abandoned branches off the pipe mentioned in Note 1 at SB SR 141 Sta. 1146+86 offset 2' left and continues in an easterly direction under SR 141 for 60' to Sta. 1146+ 85 offset 61' right where it begins to bend slightly in a south-easterly direction for approximately 25' before

- bending back to the east and continuing for another 25' and ends at 1146+67 offset 109'.
- b. A 3/4" copper service line branches off the pipe mentioned in Note 1 at SB SR 141 Sta. 1147+92 offset 3' left and continues east beneath SR 141 for 165' until Sta. 1147+91 offset 166' right.
2. A 16" Cast Iron pipe running along the westerly side of SB SR 141 beginning at Sta. 1134+31 offset 50' left, and the line continues in a northerly direction until Sta. 1134+37 offset 50' left, when it bends in a north-westerly direction and continues to Sta. 1134+44 offset 57' left. The line then returns to its northerly path until Sta. 1135+56 offset 67' left. The line then bends 45-degrees in a north-easterly direction and continues to Sta. 1135+70 offset 47' left. The line then bends in a northerly direction and continues to Sta. 1143+10 offset 18' left, where it bends 45-degrees in a north-westerly direction to Sta. 1143+71 offset 75' left into the existing building on the DEANG site.
 3. A 16" Cast Iron pipe on the westerly side of SB SR 141 beginning at Sta. 1135+65 offset 140' left continues in an easterly direction until offset 115' left where the pipe bends 45-degrees in a north-easterly direction until Sta. 1136+07 offset 72' left, the pipe then bends 45-degrees in a northerly direction and continues parallel to SB SR 141 until Sta. 1139+00 offset 68' left, where it bends 45-degrees in a north-easterly direction and continues to Sta. 1139+38 offset 43' left, where it returns to its northerly direction and continues to Sta. 1142+23 offset 37' left. The pipe then bends 45-degrees in a north-westerly direction and continues to Sta. 1143+26 offset 140' left, the pipe then bends 90-degrees in a south-westerly direction and continue for 50' outside the project limits.
 - a. An 8" Cast Iron pipe branches off the pipe mentioned in Note 3 at SB SR 141 Sta. 1142+36 offset 50' left and continues diagonally beneath SR 141 NB & SB in a north-easterly direction for 125' until it reaches Sta. 1143+19 offset 39' right and makes a 45 degree turn in an easterly direction and continues its run beneath Bellecor Dr. for 140' until Sta. 1143+20 offset 179' right where it makes a 90 degree turn in a north-westerly direction and continues its run in that direction for another 65' until it ends at Sta. 1143+61 offset 133' right.
 4. A 12" Ductile Iron pipe on the easterly side of Commons Blvd. beginning at Sta. 2065+50 offset 35' right continues parallel along Commons Blvd. until Sta. 2078+50 where it ties in with the pipe in Note 1 above at Sta. 2078+50 offset 66' right.
 - a. A 12" Ductile Iron pipe branches off at Sta. 2069+30 offset 90' right, at a 90-degree angle in an easterly direction and continues 55' where it bends 45-degrees in a south-easterly direction and continues to Sta. 2068+84 offset 170' right, where it the bends 45-degrees in an easterly direction for 125' and continues outside the project limits.
 - b. A 12" Ductile Iron pipe branches off at Sta. 2075+10 offset 46' right, in a northerly direction for 150' to Sta. 2075+05 offset 105' left, the pipe then bends in a north-westerly direction for 30' to Sta. 2074+87 offset 122' left, and then returns to its northerly path for another 50' to Sta. 2074+86 offset 170' left and continues outside the project limits.
 5. A 12" Ductile Iron pipe continues parallel to the eastbound travel lanes of East Commons Blvd, beginning at Sta. 2202+85 offset 20' right and continuing beyond Sta. 2200+00 until it ties in with the pipe in Note 1 above at SB SR 141 Sta. 1151+17 offset 5' left.
 6. An 8" Cast Iron pipe continues parallel along the southerly side of Paul Rd, starting at Sta. 3001+55 offset 15' right and continuing until Sta. 3000+36 offset 17' right, where it

takes a 90 degree turn in a northerly direction, where it continues beneath NB SR 141 until Sta. 1041+76 offset 27' right, where it makes a 90 degree turn in a westerly direction and continues 70' until Sta. 1041+80 offset 33' left where it ties in with the pipe mentioned in Note 1 which continues under SB SR 141.

- a. An 8" Cast Iron pipe branches off the pipe mentioned in Note 6 at Sta. 3001+44 offset 17' right on Paul Rd and continues perpendicular to Paul Rd for 45' and it ends at Sta. 3001+44, offset 30' left.
 - b. An 8" Cast Iron Pipe branches off the pipe mentioned in Note 6 at NB SR 141 at Sta. 1041+75 offset 28' right and continues east for 7' before it turns 90-degrees in a northerly direction continuing parallel to NB SR 141 until Sta. 1042+70 offset 36' right where it makes a 90 degree turn in an easterly direction and continues parallel to Bellecor Dr. for 125' and ends at Sta. 1042+42 offset 113' right.
 - i. An 8" Cast Iron pipe branches off the pipe mentioned in Note 6b at Sta. 1042+68 offset 45' right, the pipe continues in a northerly direction (parallel to NB SR 141) for 13' before it makes a 45 degree turn to continue in a north-easterly direction (diagonally beneath Bellecor Dr.) for 130' and ends at Sta. 1042+73 offset 178' right.
7. A 12" Ductile Iron pipe begins on the southerly side of Creekwood Dr. at Basin Rd. Sta. 3302+00 offset 11' right and continues west to Sta. 3301+19 offset 27' right, the pipe then bends 45-degrees and continues in a north-westerly direction to Sta. 3300+68 offset 28' left, the pipe then bends 45-degrees to the north and runs parallel to NB SR 141 until Sta. 1065+75 offset 47' right where it makes a 90 degree turn and continues Sta. 1065+78 offset 32' left.
- a. A 12" Ductile Iron pipe branches off the pipe mentioned in Note 7 at Sta. 3301+87 offset 20' right and runs perpendicular to Sta. 3301+88 offset 43' right where it ends at a fire hydrant.
 - b. A 12" Ductile Iron pipe branches off the pipe mentioned in Note 7 at Sta. 1065+85 offset 13' left and continues to 1069+86 offset 21' left where it turns 90-degrees for 5' and ties into the previously relocated contract No. T201109002 project limits.
 - c. A 16" Cast Iron pipe branches off the pipe mentioned in Note 1 at Sta. 1166+25 offset 27' left and continues in an easterly direction beneath SB SR 141 and continues beneath the stone driveway between NB & SB SR 141 for 385' until it reaches NB SR 141 Sta. 1065+78 offset 32' left.
8. A 16" Cast Iron pipe begins from Sta. 1083+75 offset 32' left where it ties into previously relocated pipe from contract No. T201109002 project, the pipe turns 90-degrees and continues east to 1083+75 offset 15' left. The pipe then turns 90-degrees in a northward direction and runs parallel to NB SR 141 to Sta. 1090+11 offset 12' left where it turns 45-degrees to Sta. 1090+65 offset 71' left, where it runs beneath I-95 to Sta. 1092+90 offset 71' left. The pipe then turns 45-degrees in a north-eastern direction to 1093+89 offset 5' left, at which point it turns 45-degrees and continues parallel along NB SR 141 to Sta. 1102+12 offset 16' where the pipe splits in two
- a. One section of the pipe turns 45-degrees in a northeastern direction to Sta. 1102+97 offset 40' right.

- b. The other section of the pipe turns 45-degrees in a northwestern direction to Sta. 1102+64 offset 77' left where it turns 45-degrees in a western direction to Sta. 1102+06 offset 489' left.

The Artesian Water Company proposes the following facilities within the project limits:

- 1. A 16" Cast Iron Pipe beneath the SB SR 141 travel lanes is being abandoned throughout the project limits from approximate Sta. 1130+00 to Sta. 1166+25.
 - a. A 20" ductile iron pipe will replace the existing 16" CIP under the SB SR 141 travel lanes by being relocated on the Parcel 1-L property.
 - i. The 20" DIP continues north and terminates with a 20" valve, followed by a short section of 20" DIP with a 2" blow-off connection, terminating in a 20" end cap at station 1149+88, offset left 81'.
 - b. A 16" DIP will tie into the existing 16" CIP at 1129+17 offset left 4', it will continue westerly to Sta. 1129+14 offset left 123', bend 90 degrees and continue to Sta. 1130+17 offset left 125' where a 20" DIP pipe will begin. It will continue North until approximate Sta. 1134+71, offset left 133', bend 45 degrees in a northeasterly direction and continue to Sta. 1135+09 offset left 96', bend 45 degrees and continue north to Sta. 1140+92 offset left 81', bend 45 degrees in a northeasterly direction to Sta. 1141+08 offset left 94', and continue north to Sta. 1149+88 offset left 81'.
 - i. An 8" CIP from the 20" DIP will be installed at Sta. 1130+17 offset left 125' and continues westerly to Sta. 1130+10 offset left 143' where it will tie into an existing 8" CIP.
 - ii. A 6" CIP from the 20" DIP will be installed at Sta. 1130+07 offset left 125' and continues easterly to Sta. 1130+13 offset left 109' where it will tie into an existing 6" CIP.
 - iii. An 8" DIP service from the 20" DIP main at Sta. 1133+55 offset left 132' will be installed and tie into the existing 8" DIP service at approximate Sta. 1133+55, offset left 158'
 - iv. A 10" DIP service from the 20" DIP main at Sta. 1135+50 offset left 96' will be installed to tie into the existing 10" DIP service at approximate Sta. 1135+50 offset left 144'.
 - v. A 12" DIP from the 20" DIP main will be installed at Sta. 1140+22, offset left 84', continue west until Sta. 1140+23, offset left 117', bend 45 degrees, continue west until Sta. 1141+77, offset left 303', bend 45 degrees, continue northwest until tying into an existing 12" DIP at Sta. 1141+80, offset left 316'.
 - 1. An 8" DIP from the 12" DIP main will be installed at Sta. 1141+63, offset left 287', continue south until Sta. 1141+45, offset left 300', bend 45 degrees and continue southwest until tying into an existing 8" CIP at approximate Sta. 1141+42, offset left 314'.
 - vi. A 12" DIP from the 20" DIP main will be installed at approximate Sta. 1142+38, offset left 95', continuing northeast to terminate with a 12" valve, follow by a short section of 12" DIP with a 2" blow-off connection, terminating in a 12" end cap at station 1142+36, offset left 68'.

- c. A 6" DIP will tie into an existing 6" CIP at Sta. 1129+21 offset left 56' and will continue westerly to Sta. 1129+19 offset left 117', bend 90 degrees and continue north to Sta. 1134+69 offset left 129', bend 45 degrees and continue northeasterly to Sta. 1135+07 offset left 92', bend 45 degrees and continue north Sta. 1140+92 offset left 76', bend 45 degrees and continue northwesterly to Sta. 1141+07 offset left 89', bend 45 degrees to Sta. 1143+32 offset left 90', bend 45 degrees and continue northwesterly to Sta. 1143+56 offset left 64'.
2. ***The work described above in Section 1 is to be completed by Artesian Forces in advance of Contract T201109001's construction.***
 3. A 12" DIP will be installed from 20" DIP main previously installed by Artesian forces at approximate Sta. 1142+36, offset left 68'. The state's contractor is to remove the existing 12" end section, existing 12" cap, and existing 2" blowoff assembly from the closed existing 12" water valve. The 12" DIP to be installed continues from this point northeast encased under the SB and NB SR 141 travel lanes until approximate Sta. 1142+26, offset right 137'. The line bends 90 degrees in both the northerly and southerly directions from this point and the relocations continue as noted below.
 - i. The northerly relocation is an 8" DIP line continuing to approximate Sta. 1142+93, offset right 164' and then bends 90 degrees in the easterly direction.
 - a. The 8" DIP line continues in the easterly direction until tying in with an existing 8" CIP at approximate Sta. 1142+70, offset right 170'.
 - i. A 2" service line for Parcel 3-R bends off the 8" DIP line at approximate Sta. 1142+93, offset right 164' and continues west terminating at the proposed TCE at approximate Sta. 1043+26, offset right 102'.
 - ii. A 8" service line bends off the 8" DIP line at approximate Sta. 1142+40, offset right 160' and continues east tying into existing facilities.
 - ii. The southerly relocation is a 12" DIP line continuing underneath the connector road between Paul Road and Bellecor Drive until tying in with an existing 8" CIP at approximate Sta. 1140+82, offset right 105'.
 4. A 20" DIP will be installed from the 20" DIP main previously installed by Artesian forces at Sta. 1149+88 offset left 81'. The state's contractor is to remove the existing 20" end section, existing 20" cap, and existing 2" blowoff assembly from the closed existing 20" water valve. The 20" DIP to be installed continues north to Sta. 1150+21 offset left 81' and then bends 45 degrees in a northwesterly direction to Commons Blvd Sta. 2077+36, offset right 81'.
 5. From the end of the 20" DIP main described in 3 at approximate Sta. 2077+36, offset right 81', the relocations continue in both the easterly and westerly direction.
 - a. The easterly 12" DIP relocation continues encased under the NB and SB SR 141 travel lanes until approximate Sta. 1050+67, offset right 54'. The 12" DIP main will be jack and bored under NB and SB SR 141 by use of a 40' x 20' launching pit adjacent to SB SR 141 and a 10' x 10' receiving pit adjacent to NB SR 141. The main will then bend 45 degrees in the northeasterly direction and continue until tying into existing 12" DIP at approximate Sta. 1051+21, offset right 94'.

- b. The westerly 20" DIP relocation continues until Sta. 2076+24, offset right 28'. The line continues north, encased under the eastbound and westbound Commons Blvd travel lanes until approximate Sta. 2176+31, offset left 62'. The 20" DIP main will be jack and bored under Commons Blvd by use of a 40'x 20' launching pit adjacent to the south side of Commons Blvd and a 10'x10' receiving pit on the north side of Commons Blvd. The line then bends 90 degrees and continues in the easterly direction until approximate Sta. 2176+79, offset left 60'. The line then bends 45 degrees and continues in the northeasterly direction until approximate Sta. 1154+09, offset left 82'. The line then bends 45 degrees and continues in the northerly direction parallel to SR 141 SB until Sta. 1161+28, offset left 61'.
 - i. A 12" DIP line will be installed from the 20" DIP line at approximate Sta. 1150+78, offset left 228', continuing in the westerly direction until tying into an existing 12" DIP line at approximate Sta. 1150+95, offset left 264'.
- 6. From the end of the 20" DIP relocated main noted in 4 at approximate Sta. 1161+28, offset left 61' the 20" DIP relocation continues by bending 90 degrees and continuing in the easterly direction. The 20" DIP main will be jack and bored under SB SR 141 by use of a 40'x 20' launching pit adjacent to the westerly side of SB SR 141 and a 10'x10' receiving pit on the easterly side of SB SR 141. The line then bends 45 degrees and continues in the easterly direction until Sta. 1061+00, offset left 28'. The line then bends 90 degrees and continues in the northerly direction parallel to NB SR 141 to Sta. 1069+65, offset left 31'. The 20" DIP relocation continues by bending 45 degrees and continuing in the northeasterly direction and tying into the existing 20" DIP line at approximate Sta. 1069+85, offset left 16'.
 - a. From the 20" DIP main relocated as noted in 5 above, an 8" DIP main will be relocated from Sta. 1161+28, offset left 40', running parallel to SB SR 141 in the northerly direction to Sta. 1166+28, offset left 40'. The line then bends 90 degrees and continues in the westerly direction, tying into an existing 8" DIP at approximate Sta. 1166+30, offset left 47'.
 - b. From the 20" DIP main relocated as noted in 5 above, a 12" DIP main will be relocated in the easterly direction and encased under NB SR 141 from Sta. 1063+38, offset left 28' to Sta. 1063+42, offset right 50' and tying into an existing 12" DIP main at this point. The 12" DIP main will be jack and bored under NB SR 141 by use of a 40'x 20' launching pit adjacent to the westerly side of NB SR 141 and a 10'x10' receiving pit on the easterly side of NB SR 141.
- 7. ***The work described in 3-6 is scheduled to be completed by the state's contractor in advance of Phase 1 as part of Contract T201109001's construction.***
- 8. A 20" DIP will be installed from approximate Sta. 1083+35, offset left 19', continue in the northerly direction parallel to NB SR 141 in the proposed shoulder until approximate Sta. 1089+98, offset left 19'. The line bends 90 degrees and continues westerly down the embankment slope until approximate Sta. 1089+98, offset left 70', the line then bends 90 degrees, continues north, into an existing vault and continues north through an existing concrete casing under I-95 Southbound. The line continues until Sta. 1093+35, offset left 69'. The line reduces to 16" DIP from Sta. 1090+24, offset left 71' to Sta. 1093+24, offset left 70'. Before entering the vault and casing noted above. The existing casing will be extended through the limits of the pavement widening for I-295 S.B. The 20" DIP bends 90 degrees before returning up the embankment slope, into the proposed shoulder

until approximate Sta. 1093+35, offset left 19'. The line then bends 90 degrees and continues north under the proposed inside NB SR 141 shoulder until approximate Sta. 1102+91, offset left 21'. The line then bends 90 degrees, runs perpendicular to NB SR 141 and continues encased in the easterly direction until approximate Sta. 1102+95, offset right 64 and ties to the existing 16" main.

- a. A 12" DIP branches off the 20" DIP main noted in 7 at approximate Sta. 1102+37 offset left 21' and continues in a westerly direction to Sta. 1102+20 offset left 38'.
- b. ***The work described in 8 is scheduled to be completed by the states contractor after sufficient embankment has been placed during Phase 5 to allow for the installation of the water main.***

It is anticipated that the state contractors' work will take 60 calendar days to complete work items 3-6 and 90 calendar days to complete work item 8 after the right-of-way and proposed work has been laid out by the state's contractor.

AT&T

The AT&T Company maintains the following facilities within the project limits:

1. Aerial facilities on Delmarva Power – Electric (DP-E) utility poles on the east side of northbound SR 141 from the southern project limits continuing north to DP-E Pole #47165-41527 approximate Sta. 1053+05, offset right.
2. An underground line from existing utility pole noted in Item 1, crossing SR 141 perpendicularly to a vault at approximate Sta. 1053+25, offset left. The line then continues west adjacent to West Commons Blvd and through the western project limits

The AT&T Company proposes to relocate the following facilities within the project limits:

1. Relocate the aerial facilities to the relocated Delmarva Power – Electric poles along the east side of northbound SR 141 throughout the project limits. AT&T will begin aerial relocations after DP-E relocations are completed.
2. Relocate the underground cables from the relocated DP-E utility pole (#41765-41527) at approximate Sta. 1053+00, offset right to the vault at approximate Sta. 1053+25, offset left.

It is anticipated that this work will take 30 calendar days to complete after AT&T has been given a minimum 21 calendar days' notice by the state's contractor that the work shall begin, and the right-of-way and proposed work has been laid out by the state's contractor.

Comcast Cable

The Comcast Cable Company maintains the following facilities within the project limits:

1. Aerial facilities on Delmarva Electric-Power (DP-E) utility poles beginning on the eastern side of northbound SR 141 at the south limits of the project. The aerial facilities continue north on the eastern side of northbound SR 141 to DP-E pole #47146-41580 at

approximate Sta. 1058+90, offset right. The aerial facilities then cross northbound SR 141 and southbound SR 141 to DP-E pole #47110-41602 at approximate Sta. 1162+75, offset left. The aerial facilities then continue north along southbound SR 141 to Airport Rd, and then continue west along on the south side of Airport Rd through the western project limits.

2. Underground facilities entering the project at the western limits along the north side of Commons Blvd and continuing east along Commons Blvd to a vault at approximate Sta. 1152+60, offset left. The underground facilities then continue north parallel to southbound SR 141 terminating at DP-E pole #47110-41602 at approximate Sta. 1162+75, offset left.

The Comcast Cable Company proposes the following facilities within the project limits:

1. Relocate the aerial facilities to the relocated Delmarva Power – Electric poles along the east side of northbound SR 141 from the southern limits to a pole at approximate Sta. 1058+75, offset right, crossing northbound SR 141 to the eastern side of SB SR 141 at approximate Sta. 1161+05, offset right. The aerial relocations then continue north along the easterly side of southbound SR 141 to approximate Sta. 1165+40, crossing to the westerly side of southbound SR 141 to approximate Sta. 1165+85, offset left. The relocations then continue north and terminate at an existing pole at Sta. 1167+20, offset left.
2. Relocate the existing underground cable, by crossing aerially from the relocated Delmarva Power – Electric Pole at Sta. 1161+05, offset right 50' to a newly placed pole by Delmarva Power – Electric at Sta. 1161+12, 58' left. The cable will then come down the pole and continue underground south, parallel to the relocated Lighttower underground cable line to the Commons Blvd intersection and tie into existing facilities at approximate Sta. 1152+63, offset left 93'.

It is anticipated that the aerial relocation work will take 15 calendar days after Delmarva Power-Electric, AT&T, and Lighttower have completed their aerial relocations. The underground relocation work will take 10 calendar days to complete. The relocations will occur after Comcast Cable has been given a minimum 40 calendar days' notice by the state's contractor that the work shall begin, and the right-of-way and proposed work has been laid out by the state's contractor.

Delmarva Power - Electric Distribution

The Delmarva Power Company maintains the following underground facilities within the project limits. Additionally, Delmarva Power Company maintains aerial facilities throughout the project limits.

1. An underground Delmarva electric line continues in a north-northeasterly direction from a utility pole, #47220-41415 on the northeast corner of Paul Rd and NB SR 141 Sta. 1041+53 offset 39' right to an electric meter located at NB SR 141 Sta. 1042+20 offset 58' right.
2. An underground Delmarva electric line continues in a northerly direction from a utility pole (unknown number) on the northeast corner of Bellecor Dr. and NB SR 141 Sta.

- 1043+35 offset 79' right, the line continues north for 70' to Sta. 1044+01 offset 84' right at which point it turns to the northeast and continues 10' to an electric meter at Sta. 1044+04 offset 97' right.
3. An underground private electric line continues on the northeast corner of Bellecor Dr. and NB SR 141, the line continues in a southeasterly direction for 10' from the NB SR 141 Sta. 1043+40, offset 97' right, the line then continues northeast to Sta. 1043+59 offset 129' right.
 4. An underground private electric line continues in a northeasterly direction from a private light pole on the northeast corner of the intersection of Bellecor Dr. and NB SR 141, Sta. 1043+03 offset 136' right and continues on private property to Sta. 1043+20' offset 156' right.
 5. An underground private electric line continues in a southwesterly direction on NB SR 141 from Sta. 1044+69 offset 107' right to Sta. 1044+25 offset 70' right, the line then turns in a west northwesterly direction and continues to Sta. 1044+52 offset 41' right, at which point the line turns to the north and continues until Sta. 1045+80 offset 113' right.
 6. An underground Delmarva electric line continues underground from a utility pole, #47180-41496 at NB SR 141 Sta. 1049+84 offset 42' right, in a southeasterly direction to Sta. 1049+19 offset 117' right, the line then turns in a north northwesterly direction until it reaches an electric meter at Sta. 1049+84 offset 119' right.
 - a. An underground private electric line breaks off and continues in a southern direction to Sta. 1048+42 offset 121' right.
 7. An underground Delmarva electric line continues northeast and outside of the project limits underground from a utility pole #47195-41525 at East Commons Blvd Sta. 2202+96 offset 0'.
 8. An underground Delmarva electric line continues southbound beneath the Business Park entrance from a private light pole at NB SR 141 Sta. 1055+30 offset 62' right to Sta. 1054+90 offset 68' right where the line turns to the east and continues until Sta. 1055+07 offset 194' right. Service will be removed.
 9. An underground private electric line continues eastbound along the entrance to the Business Park, from NB SR 141 Sta. 1054+91 offset 136' right to Sta. 1055+07 offset 193' right.
 10. An underground Delmarva electric line continues from the northeast corner of the Business Park entrance and NB SR 141 at Sta. 1055+42 offset 190' right, the line runs in a north-westerly direction, parallel to the Business Park entrance until Sta. 1056+27 offset 73' right at which point the line turns and continues north, parallel to NB SR 141 to Sta. 1061+95 offset 100' right.
 - a. An underground Delmarva electric line breaks off the line mentioned in Note 10 at Sta. 3301+05 offset 28' left and runs in an eastern direction to Sta. 3301+95 offset 22' left where it ends.
 - b. An underground Delmarva electric line breaks off the line mentioned in Note 10 at Sta. 3301+05 offset 28' left and runs in a westerly direction to Sta. 3300+92 offset 32' left where it turns 90-degrees and continues in a southern direction to Sta. 3300+88 offset 0' where the line ends at a private light pole. Service being removed.
 11. An underground Delmarva electric line continues from Sta. 3302+53 offset 64' right in a north-western direction to Sta. 3301+39 offset 47' right where it turns 90-degrees in a south-western direction to Sta. 3301+11 offset 75' right.

12. A Delmarva ground mounted transformer exists at Sta. 4107+03 offset 10' right that will need to be removed as part of this project.

The Delmarva Power – Electric company proposes to install the additional utility poles within the project limits as part of this contract:

NB SR 141

- 1039+45 42' right
- 1041+58 50' right – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1043+68 47' right – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1045+21 49' right – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1047+26 48' right – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1048+24 47' right – Proposed 12' cobrahead mast arm to be added; Proposed 250W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-04-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1049+84 45' right– Proposed 12' cobrahead mast arm to be added; Proposed 250W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-04-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1050+56 51' right – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1052+26 52' right (55' Tall Pole) – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1053+02 53' right (50' Tall Pole)– Provide 120/240V service to the proposed signal equipment.

- 1053+99 53' right – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1054+48 98' right
- 1056+00 76' right
- 1057+37 81' right
- 1058+73 76' right

East Commons Blvd

- 2200+93 56' left (55' Tall Pole) – Proposed 15' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 2202+60 47' left (50' Tall Pole)

SB SR 141

- 1203+44 219' left – Provide 277/480V service to the proposed lighting equipment. Install a proposed overhead power line to the proposed utility pole at Sta. 1203+44 offset 156' left.
- 1200+05 59' left – Provide 120/240V service to the proposed signal equipment. Install a proposed overhead power line to the existing utility pole at Sta. 1190+70 offset 261' left.
- 1142+08 52' left (80' Tall Wooden Pole)
- 1143+13 52' left – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1144+81 52' left – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1146+17 53' left – Proposed 12' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1150+52 87' left – Provide 120/240V service to the proposed ITMS and lighting equipment.
- 1153+94 61' left
- 1161+04 46' right
- 1161+12 58' left – Delmarva adding pole for communication companies.

- 1162+90 46' right – Proposed 15' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1163+54 46' right
- 1163+91 55' left
- 1164+97 46' right – Proposed 15' cobrahead mast arm to be added; Proposed 400W HPS equivalent, LED luminaire, Medium Cutoff, NEMA Type II distribution luminaire (NAV-AF-06-D-UNV-SL2-800 or approved equal) to be installed 25' above the roadway surface.
- 1164+98 56' left
- 1165+38 46' right
- 1165+44 56' left
- 1165+86 55' left – Delmarva will set pole for Comcast outside fence for their crossing.

Southbound I-95

- 7034+12 125' right – Provide 277/480V service to the proposed lighting equipment.

The Delmarva Power -Electric company proposes the adjustments to the following utility poles within the project limits:

SB SR 141

- 1167+19 55' left – Provide 120/240V service to the proposed signal, lighting and ITMS equipment.
- 1199+70 261' left – Install a proposed overhead power line to the proposed utility pole at Sta. 1200+05 offset 59' left.
- 1206+45 166' left – Maintain 120/240V service to the proposed ITMS equipment. Provide 240/480V service to the existing lighting equipment.

NB SR 141

- 1053+06 48' right – Remove existing power source for signals.
- 1041+53 37' right – Existing utility pole to be removed. Existing lighting mast arm and luminaire to be removed.

Commons Blvd.

- 2075+52 50' right – Existing utility pole to be removed. Existing lighting mast arm and luminaire to be removed.
- 2077+02 55' right – Existing utility pole to be removed. Existing lighting mast arm and luminaire to be removed.

Southbound I-95

- 7060+25 117' right – Maintain 120/240V service to the existing lighting and ITMS equipment.

The Delmarva Power Company proposes to remove the following facilities within the project limits:

Ramp M

- Existing electric transformer at Sta. 4107+00, offset right.

It is anticipated that this work will take 84 calendar days to complete after Delmarva Power-Electric has been given a minimum 30 calendar days' notice by the state's contractor that the work shall begin, any cuts/fills/clearing have been completed, and the right-of-way and proposed work has been laid out by the state's contractor. State's Contractor to coordinate electric services with Delmarva Power - Electric

Delmarva Power – Substation (Parcel 4-L)

The existing fence adjacent to SB SR 141 surrounding the Delmarva Power – Substation will be relocated by Delmarva Power forces to allow for SB SR 141 roadway widening. This includes removing the existing fence, placement of a temporary fence, construction of a new permanent fence, and placement of #57 stone around the new permanent fence. It is anticipated that this work will occur during Spring/Summer/Fall of 2019 concurrent with other Delmarva Power – Electric relocations and will be completed prior to the state's contractor beginning construction of Phase 1 work. State's contractor shall coordinate with Delmarva Power – Electric.

Delmarva Power - Gas Distribution

The Delmarva Power – Gas Distribution Company maintains the following facilities within the project limits:

1. An 8" plastic gas line beginning at Sta. 1134+31 offset 41' left on SB SR 141 that continues north beneath the SB SR 141 travel lanes until Sta. 1140+32 offset 38' left, at which point the pipe turns 90-degrees to the east and continues 13' until Sta. 1140+31 offset 26' left at which point it turns 90-degree in a northerly direction and continues beneath SB SR 141 until approximate Sta. 1143+00 when the pipe changes from an 8" plastic line to a 6" steel line and continues beneath SB SR 141 until Sta. 1156+05 offset 24' left. The pipe then makes a 90-degree turn and continues in an easterly direction for 65' to Sta. 1156+00 offset 41' right; the pipe then makes another 90 degree turn in a northerly direction and continues beneath the NB SR 141 travel lanes until NB SR 141 Sta. 1074+75, offset 7' left and ties into the previously relocated facilities under Contract T201109002.
 - a. A 4" plastic gas line branches off the pipe mentioned in Note 1 on SB SR 141 at Sta. 1134+92 offset 41' left in a southwesterly direction and continues 60' to Sta. 1134+86 offset 102' left.
 - b. A 3" steel gas pipe branches off the pipe mentioned in Note 1 on SB SR 141 at Sta. 1141+50 offset 25' left. The pipe continues in an easterly direction towards Paul Rd., beneath the travel lanes of SR 141 and then continues parallel to Paul Rd. until Sta. 3001+47, offset left 17'.
 - i. A 2" plastic pipe branches off the pipe mentioned in Note 1.b. on Paul Rd at Sta. 3000+66, offset left 17', and continues in a northerly direction

parallel to the street between Paul Rd. and Bellecor Dr. for 160' until Sta. 3000+58, offset left 175' at which point it intersects with the pipe mentioned in Note 1.c..

- c. A 2" steel gas pipe branches off the pipe mentioned in Note 1 on SB SR 141 at Sta. 1142+78, offset left 23', the pipe continues in an east-northeast direction for 82' until Sta. 1142+85 offset right 105', at which point it makes a 45 degree turn in an easterly direction and continues for 75' until Sta. 1142+45 offset right 198' and ends just beneath Bellecor Dr.
 - d. A 6" steel gas pipe branches off the pipe mentioned in Note 1 on SB SR 141 at Sta. 1144+88 offset left 20', the pipe continues in a south-westerly direction beneath the SB SR 141 travel lanes for 10' until Sta. 1144+87 offset left 29'.
 - e. A 2" steel gas pipe branches off the pipe mentioned in Note 1 on SB SR 141 at Sta. 1151+05 offset left 20', the pipe continues in an easterly direction 44' until Sta. 1151+05 offset left 63,' where it makes a 90 degree turn in a northerly direction and continues beneath the travel lanes of NB SR 141 from Sta. 1051+08 offset right 23' to Sta. 1051+68 offset right 25' where it makes a 90 degree turn in a north-easterly direction and continues beneath the westbound travel lanes of East Commons Blvd from Sta. 2200+25 offset left 26' to Sta. 2201+87 offset left 20'.
 - i. A 2" plastic gas line branches off the pipe mentioned in Note 1.e. on East Commons Blvd at Sta. 2202+49 offset left 25' and continues southeast (into the parking lot) for 60' until Sta. 2202+51 offset right 85'.
 - f. A 2" steel gas line branches off the pipe mentioned in Note 1, at Sta. 1156+01 offset right 20'. The pipe continues south for 10' and then makes a 90 degree turn and continues east towards the entrance of the Business Park for approximately 180' until 1155+36 offset right 194'.
 - g. A 6" steel gas line branches off the pipe mentioned in Note 1 at Sta. 1065+47 offset left 1' and continues in a westerly direction towards SB SR 141 Sta. 1166+34 offset left 89'.
2. A 4" plastic gas line continuing along the northerly side of Commons Blvd. beginning at Sta. 2172+47 offset 59' left and continues in a northerly direction for 20' to Sta. 2172+47 offset 79' left before making a 90 degree turn in an easterly direction and continues running parallel to Commons Blvd. until Sta. 2174+96 offset 77' left at which point it makes a 90 degree turn in a southerly direction and continues 20' to Sta. 2174+96 offset 57' left before making a 90 degree turn to continue heading in an easterly direction along Commons Blvd. until it ties into the 6" steel pipe from Note 1 at Sta. 2178+40 offset 45' left.
 - a. A 4" plastic gas line branches off the pipe mentioned in Note 2 at Sta. 2174+87 offset 78' left and continues in a north-northwesterly direction for 50' to Sta. 2174+72 offset 123' left and through the project limits.
 3. A 2" steel pipe from outside the project limits runs parallel to Bellecor Dr. and continues from NB SR 141 Sta. 1042+82 offset 175' right to Sta. 1043+64 offset 103' right.
 4. A 6" steel gas line continuing from previously relocated limits under Contract T201109002 starts at Sta. 1078+22 offset 5' left and continues parallel to the northbound travel lanes to approximate Sta. 1090+50 where it is then attached under Bridge No. 676 to approximate Sta. 1093+00 and the gas line then continues parallel to the travel lanes to

Sta. 1102+16 offset 12' left and turns 45-degrees in a northeastern direction to Sta. 1103+46 offset 92' right.

The Delmarva Power Company proposes the following facilities within the project limits to be relocated as part of this contract prior to Phase 1 work beginning:

1. An 8" Plastic gas line will be relocated from its existing location to a new location beginning at SB SR 141 Sta. 1134+92 offset 42' left, the pipe continues in an easterly direction until Sta. 1134+92 offset 26' left, at which point the pipe makes a 90 degree turn in a northerly direction until Sta. 1146+20 offset 37' left at which point it turns 90-degrees in a westerly direction until Sta. 1146+20 offset 53' when the pipe turns 90-degrees in a northerly direction until Sta. 1156+00 offset 58' left, the pipe then turns 90-degrees in an easterly direction until the pipe ties into existing facilities at Sta. 1156+03 offset 25' right.
 - a. An 8" plastic pipe branches out of the pipe mentioned in Note 1 at SB SR 141 Sta. 1141+72 offset 37', the pipe continues in an easterly direction to Sta. 3000+64 offset 26' left, where it turns to Sta. 30064 offset left 18' and ties into existing facilities at Paul Rd.
2. An 8" Plastic gas line will replace the existing 4" gas line that runs along the northerly side of Commons Blvd. The new 8" plastic gas line begins at Commons Blvd Sta. 2175+31 offset 61' left and continues in a northerly direction for 4' and turns 90-degrees to continue parallel to Commons Blvd. across NB and SB SR 141 travel lanes, the gas line continues in an easterly direction until East Commons Blvd Sta. 2202+00 offset 57' left, at which point the pipe turns 90-degrees in a southerly direction until it ties into existing facilities at Sta. 2202+00 offset 25' left.

The Delmarva Power-Gas Company proposes the following facilities within the project limits to be relocated as part of this project during Phase 5 after sufficient embankment has been placed by the state's contractor to allow for the installation of the gas main.

1. An 8" Plastic gas line will be relocated from its existing location to a new location beginning at 1083+85 offset 7' left continuing westward to 1083+85 offset 13' left, where it bends 90 degrees and continues in the northerly direction under the proposed inside NB SR 141 shoulder and runs parallel, 6' offset, to a relocated Artesian 20" ductile iron pipe water main until Sta. 1089+87 offset left 13' at which point the line ties into an existing facility.
2. The relocations continue the north side of Bridge No. 676, tying in to existing facilities at approximate Sta. 1093+42, offset left 13', continuing north in the inside NB SR 141 shoulder, running parallel to the existing 20" DIP Artesian water main noted in 1, until approximate Sta. 1102+18, offset left 13'. The line then bends 45 degrees before tying into existing facilities at approximate Sta. 1102+23, offset left 7'.

It is anticipated that this work will take 223 calendar days to complete after Delmarva Power-Gas has been given a minimum 60 calendar days' notice by the state's contractor that the work shall begin, and the right-of-way and proposed work has been laid out by the state's contractor.

Lighttower

The Lighttower Company maintains the following facilities within the project limits:

1. Aerial facilities on Delmarva Power – Electric (DP-E) utility poles on the east side of northbound SR 141 beginning on DP-E Pole #47233-41416 along Paul Rd at approximate Sta. 3001+59, offset left continuing west to DP-E Pole #47220-41415 approximate Sta. 1041+53, offset right. The facilities then continue north along DP-E poles on the easterly side of northbound SR 141 to DP-E pole #47146-41580 at approximate Sta. 1058+90, offset right. The aerial facilities then cross northbound SR 141 and southbound SR 141 and terminate at DP-E pole #47110-41602, approximate Sta. 1162+75, offset left.
2. Underground facilities entering the project at the western limits along the north side of Commons Blvd and continuing east along Commons Blvd to a vault at approximate Sta. 1153+30, offset left. The underground facilities then continue north parallel to southbound SR 141 terminating at DP-E pole #47110-41602 at approximate Sta. 1162+75, offset left.

The Lighttower Company proposes the following facilities within the project limits:

1. Relocate the aerial facilities to the relocated Delmarva Power – Electric poles along the east side of northbound SR 141 and crossing northbound SR 141 and southbound SR 141 to approximate Sta. 1163+00.
2. Relocate a 2” conduit underground facility running from an existing junction well at Sta. 1153+30 offset left 63’ and continuing in a northerly direction on the western side of SB SR 141 to a new Delmarva Power - Utility pole at Sta. 1161+12 offset left 58’.

It is anticipated that this work will take 35 calendar days to complete after Delmarva Power – Electric and AT&T have completed their relocations, and after Lighttower has been given a minimum 45 calendar days’ notice by the state’s contractor that the work shall begin, and the right-of-way and proposed work has been laid out by the state’s contractor

New Castle County – Sewer

New Castle County maintains the following facilities within the project limits:

1. A 8” unknown material sewer line beginning outside the project limit continues beneath Paul Rd from Sta. 3002+45, offset 7’ left to Sta. 3000+95, offset 1’ left, at which point the pipe makes a 90 degree turn in a northerly direction and changes to a 2” unknown material sewer line and continues up the side street between Paul Rd. and Bellecor Dr. and continues north for approximately 70’ where it stops at Sta. 3000+78 offset 70’ left beneath the side street.
 - a. An 8” unknown material sewer line beginning outside the project limits continues beneath Morris Rd and ties into the pipe mentioned in Note 1 at Paul Rd. Sta. 3001+76 offset 5’ left.

2. A 14" unknown material sewer line beginning outside the project limits continues in a westerly direction under NB SR 141 Sta. 1048+00 offset 128' right and heads in a northwesterly direction and directly to a point on the northwest corner median of SB SR 141 and Commons Blvd. Sta. 1152+06, offset left 69'. The pipe continues in a northwesterly direction beneath the median and continues beneath the right turn lane onto westbound Commons Blvd. to Sta. 2177+60 offset 75' left.
 - a. A lateral from a building beginning on the easterly side of NB SR 141 at Sta. 1049+75, offset right 119' continues in a westerly direction tying into the existing 14" sewer line noted above at Sta. 1049+73, offset right 27'.
3. A 4" unknown material sewer line beginning at the northeast corner of East Commons Blvd and NB SR 141 at Sta. 2200+75 offset 80' left, this pipe then continues in a westerly direction to a manhole and tie in with existing system noted above in 2 at Sta. 1152+06, offset left 69'.
4. A 24" reinforced concrete sewer line beginning at SB SR 141 Sta. 1159+64 with a 100' offset left which continues in an easterly direction beneath SB SR 141 travel lanes until it reaches Sta. 1159+67 offset 11' right. The pipe then turns 90-degrees in a northerly direction and continues parallel to SB SR 141 travel lanes until Sta. 1162+74 offset 8' right, at which point the pipe turns 90-degrees in an east-northeasterly direction and continues beneath the median and NB SR 141 travel lanes until it reaches NB SR 141 Sta. 1063+76 offset 240' right.
5. A 24" reinforced concrete sewer line beginning at SB SR 141 Sta. 1159+37, offset left 41' continues in an easterly direction to Sta. 1159+59 offset 25' right. The pipe then turns and continues in a north-northeasterly direction beneath the grass median and beneath NB SR 141 travel lanes until it reaches NB SR 141 Sta. 1060+869 with a 65' offset right.

New Castle County is proposing to relocate the following facilities within the project limits. All relocations of New Castle County facilities listed below are to be completed by the state's general contractor:

1. Install a new 15" SDR-26 PVC sewer pipe (SP-1) beginning at NB SR 141 Sta. 1047+99 offset 129' right. SP-1 continues in a westerly direction beneath NB and SB SR 141 to a new 60" sanitary manhole (SM-1) at Sta. 1147+95 offset 68' left. Install a new 15" SDR-26 PVC sewer pipe (SP-2) from SM-1 in a northerly direction to a new 60" sanitary manhole (SM-2) at Sta. 1150+26 offset 66' left. Install a new 15" SDR-26 PVC sewer line (SP-3) from SM-2 in a northerly direction beneath Commons Blvd. to a new 60" sanitary manhole (SM-3) at Sta. 1152+15 offset 76' left and ties to the existing facilities.
 - a. Install a new 4" SDR-26 PVC (SP-4) from SM-3 in a southeasterly direction to tie to existing facilities at Sta. 1152+08, offset left 58'.
 - b. As described in 2.a. of the existing facilities, a sanitary sewer lateral will be relocated. Install a new 6" SDR-26 PVC (SP-5) sewer pipe from SP-1 at approximate Sta. 1047+99, offset right 57' and continue north to tie to the existing lateral at Sta. 1049+73, offset right 57'.
2. Install a new 24" SDR-26 PVC sewer line (SP-6) beginning at a new 60" sanitary doghouse manhole (SM-4) at SB SR 141 Sta. 1159+67 offset 3' right. SP-6 continues in an easterly direction to a new 60" manhole (SM-5) at Sta. 1159+67, offset right 30'. Install a new 24" SDR-26 PVC sewer line (SP-7) from SM-5 in a northerly direction to a

new 60" sanitary doghouse manhole (SM-6) at approximate Sta. 1162+62, offset right 116'.

3. Existing sanitary manholes located at Sta. 1049+52 offset 39' right, and Sta. 1152+07 offset 69' left shall be removed by the contractor.
4. Existing sanitary manholes located at Sta. 1049+72, offset 27' right, Sta. 1159+67, offset 11' right, Sta. 1159+58, offset 25' right, Sta. 1162+74, offset 8' right, and Sta. 1060+86, offset right 62' shall be abandoned and filled.
5. Existing sanitary manholes located at Sta. 1152+42 offset 99' left and Sta. 1041+00 offset 88' right shall be adjusted by the contractor.
6. Existing Sanitary piping beginning at Sta. 1048+00, offset 128' right to Sta. 1152+07, offset 69' left shall be flowable filled and abandoned.
7. Existing Sanitary piping beginning at Sta. 1159+37, offset 41' left to Sta. 1060+86, offset 63' right shall be flowable filled and abandoned.
8. Existing Sanitary piping beginning at Sta. 1159 67, offset 10' right to Sta. 1162+74, offset 8' right to Sta. 1162+74, offset 117' right shall be flowable filled and abandoned.

It is anticipated that this work will take 50 calendar days to complete by the state's general contractor prior to Phase 1 after right-of-way has been cleared or as directed by the engineer.

Verizon of DE

Verizon of Delaware maintains the following aerial facilities within the project limits:

1. Verizon maintains aerial facilities on the Northbound side of SR 141 from Unknown Pole # at Station 99+43 right 51' extending east beyond the project limits and extending north to Pole #47165-41527 at Station 1053+56 right 48'.
2. Verizon maintains aerial facilities on the Southbound side of SR 141 from Unknown DPL Pole # at Station 1135+43 left 120' extending west beyond the project limits.
3. Verizon maintains aerial facilities on the Northbound side of SR 141 from Unknown DP&L Pole # at Station 1043+18 right 36' extending east along Bellecor Drive beyond the project limits.
4. Verizon maintains aerial facilities from Pole #2 at Station 3102+12 left 48' on the north side of Bellecor Drive extending south across Bellecor Drive to Morris Road and beyond the project limits.
5. Verizon maintains aerial facilities on the Northbound side of SR 141 from Pole #47187-41481 at Station 1048+33 right 40' extending east to Union Electric Works, Inc.
6. Verizon maintains aerial facilities along the centerline of Commons Blvd. from Pole #47172-41512 at Station 1051+41 right 45' extending east beyond the project limits.
7. Verizon maintains aerial facilities along the Southbound side of SR 141 from DP&L Pole #47110-41602 at Station 1162+74 left 43' extending north to DP&L Pole #470907-41625 at Station 1165+02 left 43' then crossing SR 141 to DP&L Pole #47104-41630 at Station 1165+01 right 46'.

8. Verizon maintains aerial facilities on the West side of Southbound SR 141 from Pole #1(Not on Plan) at Station #1200+39 left 99' extending north across St. James Street and beyond the project limits.

9. Verizon maintains aerial facilities on the West side of Southbound SR 141 from Pole #1(Not on Plan) at Station #1200+39 left 99' extending southwest beyond the project limits.

Verizon of Delaware maintains the following underground facilities within the project limits:

1. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 129, at Station 1030+18 right 6' extending south beyond the project limits.

2. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 129 at Station 1030+18 right 6' extending north to MH 130, at Station 1035+88 left 1'.

3. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 130 at Station 1035+88 left 1' extending east across Southbound SR 141 where its dead ends near station 1035+91 left 62'.

4. Verizon maintains buried facilities on the Northbound side of SR 141 from MH 130 at Station 1035+88 left 1' extending west to Unknown DP&L Pole at Station 1135+43 left 120'.

5. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 130 at Station 1035+88 left 1' extending north to MH 131 at Station 1042+17 left 7'.

6. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 131 at Station 1042+17 left 7' extending northeast to VZ Pole #F228/1 at Station 3100+69 left 38'.

7. Verizon maintains underground facilities on the Northbound side of SR141 from MH 131 at Station 1042+17 left 7' extending north to MH 132 at Station 1047+25 left 12'.

8. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 132 at Station 1047+25 left 12' extending north to MH 133 at Station 1054+04 right 29'.

9. Verizon maintains underground facilities from MH 133 on the Northbound side of SR 141 at Station 1054+04 right 29' extending east on the southerly side of Business Park Drive beyond the project limits to MH 1170.

10. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 133 at Station 1054+04 right 29' extending south to DP&L Pole #47165-41527 at Station 1053+56 right 48'.

11. Verizon maintains underground facilities on the Northbound side of SR 141 from MH 133 at Station 1054+04 right 29' extending northwest to MH 152 at Station 1154+93 right 16'.

12. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 152 at Station 1154+93 right 16' extending west to MH 153 at Station 1154+86 left 44'.

13. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 153 at Station 1154+86 left 44' extending south to Commons Blvd. and continuing west along the north side of Commons Blvd. to MH 154 at Station 2173+58 left 40'.

14. Verizon maintains underground facilities on the north side of Commons Blvd. from MH 154 at Station 2173+58 left 40' extending west along Commons Blvd. beyond the project limits.
15. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 152 at Station 1154+93 right 16' extending north to MH 134 at Station 1159+46 right 10'.
16. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 134 at Station 1159+46 right 10' extending north to MH 135 at Station 1165+55 right 7'.
17. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 134 at Station 1159+46 right 10' extending north to a Pedestal at Station 1162+42 left 43' and continuing west beyond the project limits.
18. Verizon maintains underground facilities on the Southbound side of SR 141 from a Pedestal at Station 1162+42 left 43' extending north to DP&L Pole #47110-41602 at Station 1162+74 left 43'.
19. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 135 at Station 1165+55 right 7' extending north to MH 136 at Station 1167+06 right 5'.
20. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 136 at Station 1167+06 right 5' extending north to MH 137 at Station 1174+84 right 6'.
21. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 137 at Station 1174+84 right 6' extending north to MH 138 at Station 1179+98 right 5'.
22. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 138 at Station 1179+98 right 5' extending north to MH 139 at Station 1187+81 right 5'.
23. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 139 at Station 1187+81 right 5' extending north to MH 140 at Station 1193+18 right 6'. The conduit hangs from the deck of existing Bridge No. 677. ***The existing conduit hanging from the bridge and through the existing abutment walls has been tested and has tested positive for asbestos. These conduits will be abandoned in place as part of contract T201809001 in advance of this contract. As part of this contract, DelDOT's state's contractor shall notify DelDOT Construction Management 2 weeks in advance of bridge deck demolition and abutment demolition on existing Bridge No. 677. DelDOT Construction Management will notify and coordinate with DelDOT Hazmat. DelDOT Hazmat will have their on-call contractor remove the asbestos conduits as demolition of the existing bridge reaches a point that the conduits can be removed. DelDOT will invoice Verizon for this work.***
24. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 140 at Station 1193+18 right 6' extending north to MH 141(Not on Plan) at Station 1200+41 right 4'.
25. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 141 at station 1200+41 right 4' extending west to Pole #1(Not on Plan) at Station #1200+39 left 99'.
26. Verizon maintains underground facilities on the Southbound side of SR 141 from MH 141 at Station 1200+41 right 4' extending north to MH 142(Not on Plan) at Station 1201+57 left 36'.

27. Verizon maintains underground facilities from MH 142 on the Southbound side of SR 141 at Station 1201+57 left 36' extending northwest to MH 143 on St. James Street at Station 1205+08 left 163'.

28. Verizon maintains underground facilities crossing St. James Street from MH 143 at Station 1205+08 left 163' extending west to Unknown Pole # at Station 1205+14 left 239'.

29. Verizon maintains underground facilities on the East side of St. James Street from MH 143 at Station 1205+08 left 163' extending north where it dead-ends near Station 1207+07 left 178'.

30. Verizon maintains buried facilities along the west side of St. James Street from Ex. VZ Ped at Station 1205+07 left 222' extending south beyond the project limits.

Verizon of Delaware proposes changes to the aerial facilities include but are not limited to:

1. Verizon will relocate cables on the East side of SR 141 Northbound from the existing DP&L poles between Pole #47237-41380 at Station 1037+52 right 36' and relocated DP-E Pole #47165-41527 at Station 1053+56 right 48'. Lateral cables will be transferred and/or relocated as required.

2. Verizon will relocate cables on the North side of Bellecor drive to the relocated DP&L poles between Unknown DP&L Pole # at Station 1043+18 right 36 and Unknown Pole # at Station 1043+34 right 79'.

3. Verizon will relocate cables running along the centerline of Commons Blvd. from Pole #47172-41512 at Station 1051+41 right 45' and Pole #417?4-41517(Not on plan). (NOTE: Maintain a Minimum of 18' 6" where Cables cross over Commons Blvd.)

4. Verizon will remove cables on the West side of SR 141 Southbound between Pole #471104-1602 at Station 1162+74 left 43' and Pole #47104-41630 at Station 1165+01 right 46'.

Verizon of Delaware proposed changes to the underground facilities include but are not limited to:

1. The following Manholes will require vertical adjustments to their Frames & Covers;

- MH 129 at Station 1030+18 right 6'
- MH 130 at Station 1035+88 left 1'
- MH 131 at Station 1042+17 left 7'
- MH 132 at Station 1047+25 left 12'
- MH 133 at Station 1054+05 right 29'
- MH 153 at Station 1154+86 left 44'
- MH 134 at Station 1159+46 right 10'
- MH 135 at Station 1165+55 right 7'
- MH 136 at Station 1167+06 right 5'
- MH 140 at Station 1193+18 right 6'
- MH 141 at Station 1200+41 right 4'
- MH 142 at Station 1201+57 left 36'
- MH 154 at Station 2173+58 left 40'

2. Verizon will install conduit turn-up at Pole #47233-41363, at Station 1135+86 left 50', and tie into existing dead ended conduit extending west from existing VZ MH #130.
3. Ex. Buried cable extending South-West from MH 130 at Station 1035+88 left 1 to Unknown DPL Pole # at Station 1135+43 left 120', will be relocated in conduit to Pole #47233-41363 at Station 1135+86 left 50' then transition to Aerial cable back to Unknown DPL Pole # at Station 1135+43 left 120'.
4. Verizon will abandon conduit from MH 130 at Station 1035+88 left 1 extending North-East to Pole #50 at Station 1035+88 right 145'.
5. Verizon will relocate/extend conduit and associated facilities at Pole #47180-41496 at Station 1049+83 right 45' to relocated DP&L Pole location.
6. Verizon will extend conduit and associated facilities at Pole #47165-45127 at Station 1053+06 right 48' to the new DP&L pole location.
7. Verizon will relocate 6 ducts from MH 133 at Station 1054+05 right 29' extending East along the South side of Business drive to tie-in point at Station 3200+97 right 22'.
8. Verizon will relocate existing VZ Pedestal and associated facilities at Station 1162+42 left 43', roughly 20' West beyond proposed fence.
9. Verizon will abandon existing ducts on the West side of SR 141 Southbound from Pedestal at Station 1162+42 left 43' extending North to Pole #47110-41602 at Station 1162+74 left 43'.
10. Verizon will relocate conduit and associated facilities along SR 141 Southbound from MH 137 at Station 1174+84 right 6' to MH 138 at Station 1179+98 right 5'.

- i. Per DelDOT Contract #T201809001; Verizon will relocate conduit and associated facilities along SR 141 Southbound from Station 1184+45 right 15' to MH 140 at Station 1193+18 right 6', under I-95 SB. (To be completed in Advance of Contract #T201109001 Construction).*

Verizon of Delaware Inc. will complete these changes after Delmarva Power – Electric, AT&T, Lighttower, and Comcast Cable have completed their relocations. These relocations/adjustments are expected to take approximately 120 calendar days to complete after the company has been given a minimum of 30 calendar days advance notice by the state's contractor that work shall begin, and the right-of-way and proposed work has been laid out in the field by the State's contractor and required tree trimming and clearing has been performed.

Zayo

The Zayo Company maintains the following facilities within the project limits.

Zayo maintains underground facilities located in Verizon conduits from the western project limits along the northerly side of Commons Blvd continuing easterly to the SR 141 and Commons Blvd intersection. The facilities continue in Verizon conduits in a northerly direction adjacent to SB SR 141. A 4" conduit exits a Verizon manhole at approximate Sta. 1155+00, offset right and continues northerly in the SR 141 median until terminating at Airport Road.

There are no apparent conflicts, there are no Zayo relocations anticipated with this contract.

GENERAL UTILITY NOTES

Outside of the companies and facilities discussed above, no additional utility involvement is anticipated. Should any conflicts be encountered as a result of the contractor's means and methods during construction requiring adjustment and/or relocation, the necessary relocation work shall be accomplished by the respective utility company and funded by the State's Contractor as directed by the District Engineer. The State Contractor shall coordinate any potential conflicts with utility companies and provide adequate notice prior to performing work. Any utility conflicts that are not readily discernable shall be coordinated by the State Contractor once the conflict is recognized. The time to complete any relocations/adjustments found to be necessary during construction of the highway project will depend on the nature of the work.

Once the State's contractor has given the Utility the advance notice required above, it is the responsibility of the State's contractor to have the work area prepared and accessible for the Utility to perform the tasks listed above. If the site conditions are not ready and the state contractor has given notice to the utility on when the work is to be accomplished, the State's Contractor shall be responsible for any extra cost incurred by the utility company and the State Contractor shall also be responsible for any time delays. Between when the required notice is given to the Utility and when the work is performed and completed, the coordination and scheduling of the Utility is the sole responsibility of the State's Contractor. All costs related to the coordination and scheduling of the utilities is incidental to the contract.

Any adjustments and/or relocations of municipally owned sewer or water facilities shall be performed by the State's Contractor in accordance with the respective agency's standard specifications as directed by the District Engineer. The State contractor shall coordinate any potential conflicts of municipally owned sewer or water facilities with facility owners and provide adequate notice to the municipally and to the District Engineer prior to performing work.

1. The Contractor's attention is directed to Section 105.09 Utilities, Delaware Standard Specifications, August 2016. The Contractor shall contact Miss Utility (1-800-282-8555) two working days prior to any excavation. The Contractor is responsible for the support and protection of all utilities when excavating. The Contractor is responsible for ensuring proper clearances, including safety clearances, from overhead utilities for construction equipment. The Contractor is advised to check the site for access purposes for his equipment and, if necessary, make arrangements directly with the utility companies for field adjustments for adequate clearances.
2. The information shown in the Contract Documents, including the Utility Statement and the Utility Schedule contained herein, concerning the location, type and size of existing and proposed utilities, their locations, and construction timing has been compiled by the preparer based on information furnished by each of the involved Utility Companies. It shall be the responsibility of the State's Contractor to verify all information and coordinate with the Utility Companies prior to and during construction, as specified in Section 105.09 of the Standard Specifications.

3. It is understood and agreed that the Contractor has considered in his bid all permanent and temporary utility appurtenances in their present and relocated positions as shown on the plans or described in the Utility Statement or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage due to any interference from the utility facilities and appurtenances or the operation of moving them, except that the Contractor may be granted an equitable extension of time. The contractor's means and method of construction are not taken into account when known utility conflicts are identified. If the Contractor's means and method of construction create a utility conflict the Utility Statement will prevail in discussions with the utility and the Contractor. The State's Contract shall be responsible for any costs associated with any temporary outages; holding, bracing and shielding of utility facilities; temporary relocations; or permanent relocations that are not specifically identified in this utility statement or shown in the contract plan set.

4. Coordination and cooperation among the Utility Companies and the State's Contractor are of prime importance. Therefore, the Contractor is directed to contact the following Utility Company representatives with any questions regarding this work prior to submitting bids and work schedules. Proposed work schedules should reflect the Utility Companies' proposed relocations. The Utility Companies do not work on weekends or legal holidays.

NAME	COMPANY	PHONE	EMAIL
Wayne Tyler	Artesian Water Company	(302) 453-6987	WTyler@artesianwater.com
Jay Everly	AT&T	(610) 238-6465	jay@trecgroup.com
Matt Murray	Comcast Cable Communications, Inc.	(717) 509-7873	mattm@americomm-llc.com
Angel Collazo	Delmarva Power – Electric Distribution	(302) 454-4370	angel.collazo@delmarva.com
Kristin Stanfill	Delmarva Power – Gas	(302) 429-3364	kristin.stanfill@delmarva.com
Nicole Brodbeck	Delmarva Power - Substation	(302) 454-4362	nicole.brodbeck@pepcoholdings.com
Bill Muehlberger	Lighttower (Crown Castle)	(585) 743-1731	Bill.Muehlberger@crowncastle.com
David C. Clark	New Castle County Department of Special Services	(302) 395-5705	dcclark@nccde.org
George Zang	Verizon Delaware, LLC	(302) 422-1238	george.w.zang@verizon.com
Chris Ricciuti	Zayo Group	(484) 696-3903	chris.ricciuti@zayo.com

5. As outlined in Chapter 3 of the DelDOT Utilities Manual, individual utility companies are responsible for obtaining all required permits from municipal, State and federal government agencies and railroads. This includes but is not limited to water quality permits/DNREC Water Quality Certification, DNREC Subaqueous Lands/Wetlands permits, DNREC Coastal Zone Consistency Certification, County Floodplain permits (New Castle County only), U.S. Coast Guard permits, US Army Corps 404 permits, sediment and erosion permits, and railroad crossing permits.
6. Individual utility companies are required to restore any areas disturbed in conjunction with their relocation work. If an area is disturbed by a utility company and is not properly restored, the Department may have the highway contractor perform the necessary restoration. Any additional costs incurred as a result will be forwarded to the utility company.
7. 16 Del. C. § 7405B requires notification to and mutually agreeable measures from the public utility operating the electric line for the any person intending to carry on any function, activity, work or operation within dangerous proximity of any high voltage overhead electric lines. All contractors/other utilities must also maintain a distance of 10'-0" from all energized lines.
8. Any existing facilities that are comprised of hazardous materials will be removed by the Utility Company unless otherwise outlined in the contract documents or language above. Any existing facilities containing hazardous materials will be purged by the Utility Company unless otherwise outlined in the contract documents or language above.

PREPARED AND RECOMMENDED BY:



Johnson, Mirmiran, & Thompson

3/1/19
DATE

APPROVED AS TO FORM BY:



Utilities Section, DelDOT

3/4/19
DATE

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T201109001

F.A.P. NO. EIM-N056(041)

SR 141, I-95 TO JAY DRIVE

NEW CASTLE COUNTY

Certificate of Right-of-Way Status - Stipulated

Status - Level 3

As acquired by 23 CFR, Part 635, and other pertinent Federal and State regulations or laws, the following certificates are hereby made in reference to this highway project:

The acquisition or right of occupancy and use of some remaining parcels is not complete, but all occupants of the residences on such parcels has had replacement housing made available to them in accordance with 49 CFR 24.04. The parcels which are not available are:

<u>Parcel No</u>	<u>Owner</u>	<u>Status</u>	<u>Availability</u>
1-R	PMG CF LLC	Condemnation	5/31/19
3-R	SROA Basin LLC	Attorney reviewing	3/1/19
5-R	Union Electrical Workers	In settlement	3/1/19
7-R	7 Commons, LLC	In Negotiations	3/1/19
2-L	NCC/DRBA	Waiting/FAA	5/31/19
4-L	DP&L	Waiting for revision	4/30/19

All necessary real property interests have been or shall be acquired in accordance with current FHWA/State directives covering the acquisition of real property.

No occupants were permanently displaced for this project and the State has physical possession and the right to remove, salvage, or demolish any personal property acquired as part of this project.

The State shall ensure that any occupants of residences, businesses, farms, or non-profit organizations and who have not yet moved from the right-of-way are protected against unnecessary inconvenience and disproportionate injury or any action coercive in nature.; and,

Anticipated clearance for all parcels is May 31 2019.

RIGHT OF WAY SECTION



James Pappas, Acting Chief of Right of Way

January 23, 2019

(Updated from November 30, 2018)



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

August 7, 2018

STIPULATED ENVIRONMENTAL REQUIREMENTS

FOR

State Contract No. T201109001
Federal Aid No.: EIM-N06(041)

Contract Title: SR 141 Improvements, I-95 Interchange to Jay Drive

In accordance with the procedural provisions for implementing the National Environmental Policy Act of 1969, as amended, the referenced project has been processed through the Department's Environmental Review Procedures and has been classified as a Level D/ Class II Action.

PERMIT REQUIREMENTS:

The proposed construction work for this project requires permit approval from the agencies listed below. It is the responsibility of the contracting agency -- the Delaware Department of Transportation, Division of Transportation Solutions -- to obtain the necessary permits to ensure that the contractor complies with the requirements and conditions established by the regulatory agencies. Written authorization from the permitting agencies is required and paperwork for on-site posting is anticipated. The proposed work for this project will be authorized under the permits listed below:

Su

REQUIRED PERMITS AND APPROVAL STATUS:

- U.S. Army Corps of Engineers (USACE) – Individual Permit– **PENDING**
- Delaware Department of Natural Resources and Environmental Control (DNREC) Wetlands & Subaqueous Lands Section (WLSL) – Subaqueous Lands and Wetlands Permit – **PENDING**
- Delaware Coastal Zone Management (CZM) – Issued – Project is not located in a Critical Resource Water - **PENDING**
- DNREC Water Quality Certification (WQC) - Issued – Project is not located in a Critical Resource Water-**PENDING**
- New Castle County – Floodplain Permit - **PENDING**



SPECIFIC REQUIREMENTS:

Compliance with all requirements of the permits is the responsibility of the contractor, who will follow all special conditions or requirements as stated within those permits. The contractor will be subject to penalties, fines, and the risk of shut down as mandated by laws governing permitting agencies if such conditions and requirements are violated or ignored. Therefore, all special conditions, general requirements, and/or other required provisions specified within the permits must be followed. Those obligations are indicated or listed within the permit package, which can be obtained from the DelDOT Contract Administration Office.

Additional requirements by DelDOT not specified within the permits, but listed below, are also the responsibility of the contractor. Noncompliance with these requirements may result in shut down of the project at the contractor's expense.

1. The contractor shall employ measures during construction to prevent spills of fuels or lubricants. If a spill should occur, efforts shall be undertaken to prevent its entry into wetlands, aquatic, or drainage areas. Any spills entering wetlands, aquatic, or drainage areas shall be removed immediately. The Division of Water Resources (DNREC), Wetlands & Aquatic Protection Branch, 302-739-4691, shall be notified of any spill(s) within six (6) hours of their occurrence. That office will determine the effectiveness of spill and contamination removal and specify remediation efforts as necessary.
2. All construction debris, excavated material, brush, rocks, and refuse incidental to the work shall be placed either on shore above the influence of flood waters or on some suitable disposal site approved by the department.
3. The disposal of trees, brush, and other debris in any stream corridor, wetland surface water or any drainage ditch is prohibited.
4. There shall be no stockpiling of construction materials or temporary fills in wetlands or subaqueous lands unless otherwise specified on project plans and approved by permitting agencies that govern them. It is the contractor's responsibility to coordinate and secure those additional permits/amendments in deviating from the plan.
5. Construction debris shall be kept from entering adjacent waterways, wetlands, ground cover, or drainage areas. Any debris that enters these areas shall be removed immediately. Netting, mats, or establishing confined work areas in stages may be necessary to address these issues.
6. Refuse material resulting from routine maintenance of worker equipment and heavy machinery is prohibited from being disposed or deposited onto or into the ground. All used oils and filters must be recycled or disposed of properly.
7. Use of harmful chemical wash water to clean equipment or machinery is discouraged. If undertaken, the residue water and/or material must be collected or contained such that it

will be disposed of properly. It shall not be deposited or disposed of in waterways, streams, wetlands, or drainage areas.

8. The contractor shall follow all requirements as indicated in the Environmental Compliance Sheet. It is be the contractor's responsibility to ensure that workers also follow this requirement. As part of the restrictions, please note the timetables reflected in the contract for the in-stream/water work for endangered species protection.
9. Fill material shall be free of oil and grease, debris, wood, general refuse, plaster and other pollutants, and shall contain no broken asphalt.

ENVIRONMENTAL COMPLIANCE SHEET:

The contractor shall pay special attention to specific construction requirements as indicated in the US Army Corps of Engineer and DNREC Subaqueous Lands Permit as well as the Environmental Compliance (EC) Sheet.

1. Specifically, please note the environmental requirements as indicated in the following notes:
 - See EC note 2:
 - Various time of year restrictions occur between March 15 to July 31 (any calendar year)
 - Fisheries – Any in-water work that blocks upstream fish passage shall be avoided from March 15-June 30.
 - MBTA – To minimize disturbance to nesting birds within the project area, the removal of vegetation should be avoided from April 1 to July 31.
 - Protection of Resources – See EC note 4.
 - Mitigation – See EC note 5.
2. DelDOT Environmental Studies Section (302) 760-2264 must be notified if there are any changes to the project methods, footprint, materials, or designs, to allow the Department to coordinate with the appropriate resource agencies (COE, DNREC, and SHPO), for approval.



STATE OF DELAWARE
 DEPARTMENT OF TRANSPORTATION
 800 BAY ROAD
 P.O. BOX 778
 DOVER, DELAWARE 19903

JENNIFER COHAN
 SECRETARY

RAILROAD STATEMENT

For

State Contract No.: T201109001

Federal Aid No.: EIM-N056 (041)

Project Title: SR 141 Improvements, I-95 Interchange to Jay Drive

The following railroad companies maintain facilities within the contract limits:

- | | |
|--|---|
| <input type="checkbox"/> Amtrak | <input type="checkbox"/> Maryland & Delaware |
| <input type="checkbox"/> CSX | <input type="checkbox"/> Norfolk Southern |
| <input type="checkbox"/> Delaware Coast Line | <input type="checkbox"/> Wilmington & Western |
| <input type="checkbox"/> East Penn | <input checked="" type="checkbox"/> None |

DOT Inventory No.: _____ No. Trains/Day: _____ Passenger Trains (Y / N): _____

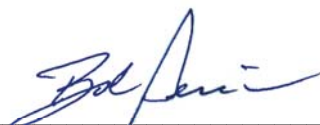
In accordance with 23 CFR 635, herein is the railroad statement of coordination (check one):

- No Railroad involvement.

- Railroad Agreement unnecessary but railroad flagging required. The contractor shall follow requirements stated in the DeIDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DeIDOT's Railroad Program Manager at (302) 760-2183.

- Railroad Agreement required. The necessary railroad agreement, attached, is complete and fully executed. Railroad related work to be undertaken and completed as required for proper coordination with physical construction schedules. The Contractor shall follow requirements stated in the DeIDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DeIDOT's Railroad Program Manager at (302) 760-2183.

Approved As To Form:



 Robert A. Perrine
 DeIDOT Railroad Program Manager

12/21/16

 DATE

BID PROPOSAL FORMS
CONTRACT T201109001.01
FEDERAL AID PROJECT IM-N056(041)

UNLESS OTHERWISE DIRECTED, SUBMIT ALL FOLLOWING PAGES TO:

DEPARTMENT OF TRANSPORTATION
BIDDERS ROOM
800 BAY ROAD
DOVER, DELAWARE 19901

Identify the following on the outside of the sealed envelope:
- Contract Number T201109001.01
- Name of Contractor

CONTRACT ID: T201109001.01 PROJECT(S): IM-N056(041)

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 BRIDGE 1-676

0010	207000 STRUCTURAL EXCAVATION	5000.000 CY				
0020	207021 STRUCTURAL BACKFILL, (BORROW TYPE C)	2900.000 CY				
0030	209004 BORROW, TYPE C	4310.000 CY				
0040	211505 REMOVAL OF EXISTING BRIDGE	LUMP		LUMP		
0050	301001 GRADED AGGREGATE BASE COURSE, TYPE B	240.000 CY				
0060	302005 DELAWARE NO. 57 STONE	570.000 TON				
0070	601190 PVC PIPE, 4"	60.000 LF				
0080	604001 PROTECTIVE SHIELD	LUMP		LUMP		
0090	604003 SHORING	LUMP		LUMP		

CANNOT BE
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 BIDDING

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0100	605021 FURNISH STEEL H PILES, HP 12" X 53"	17520.000 LF				
0110	605071 FURNISH STEEL H INDICATOR OR TEST PILES, HP 12" X 53"	1380.000 LF				
0120	605121 INSTALL STEEL H PILES, HP 12" X 53"	17520.000 LF				
0130	605171 INSTALL STEEL H INDICATOR OR TEST PILES, HP 12" X 53"	1380.000 LF				
0140	605201 DYNAMIC PILE TESTING BY CONTRACTOR	16.000 EACH				
0150	610001 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT FOOTING, CLASS A	370.000 CY				
0160	610002 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A	470.000 CY				
0170	610003 PORTLAND CEMENT CONCRETE MASONRY, PIER FOOTING, CLASS A	365.000 CY				
0180	610004 PORTLAND CEMENT CONCRETE MASONRY, PIER ABOVE FOOTING, CLASS A	40.000 CY				
0190	610008 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	85.000 CY				

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0200	610016 PORTLAND CEMENT CONCRETE MASONRY, CLASS D	60.000 CY				
0210	610018 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS D	260.000 CY				
0220	610500 ULTRA HIGH PERFORMANCE CONCRETE	1280.000 CF				
0230	611001 BAR REINFORCEMENT, EPOXY COATED	205500.000 LB				
0240	612500 PRECAST CONCRETE PIER CAP	110.000 CY				
0250	612501 PRECAST CONCRETE PIER COLUMN	49.000 CY				
0260	613000 EPOXY CONCRETE SEALER	2250.000 SF				
0270	613001 SILICONE-BASED ACRYLIC CONCRETE SEALER	14500.000 SF				
0280	615501 PREFABRICATED SUPERSTRUCTURE MODULES	LUMP	LUMP			
0290	615504 BRIDGE ELECTRICAL SYSTEM	LUMP	LUMP			

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0300	624000 PREFABRICATED EXPANSION JOINT SYSTEM, 3"	158.000 LF				
0310	625501 POLYESTER POLYMER CONCRETE OVERLAY INSTALLATION	2625.000 SYIN				
0320	625502 FURNISH POLYESTER POLYMER CONCRETE OVERLAY	75.000 CY				
0330	707015 RIPRAP, R-4	345.000 TON				
0340	708003 GEOTEXTILES, RIPRAP	1210.000 SY				
0350	709000 PERFORATED PIPE UNDERDRAINS, 4"	250.000 LF				
0360	727007 BRIDGE SAFETY FENCE, TYPE 1	625.000 LF				
0370	807003 FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	320.000 LF				
0380	807006 RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	320.000 LF				

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT		
			DOLLARS	CTS	DOLLARS	CTS	
0390	907007 REFLECTOR PANELS	28.000					
	EACH						
0400	908004 TOPSOIL, 6" DEPTH	2060.000					
	SY						
0410	908014 PERMANENT GRASS SEEDING, DRY GROUND	2060.000					
	SY						
0420	908017 TEMPORARY GRASS SEEDING	2060.000					
	SY						
0430	908020 EROSION CONTROL BLANKET MULCH	2060.000					
	SY						
	SECTION 0001 TOTAL						
SECTION 0002 BRIDGE 1-677							
0440	207000 STRUCTURAL EXCAVATION	4100.000					
		CY					
0450	207021 STRUCTURAL BACKFILL, (BORROW TYPE C)	2750.000					
		CY					
0460	209004 BORROW, TYPE C	2510.000					
		CY					
0470	211505 REMOVAL OF EXISTING BRIDGE	LUMP		LUMP			

CONTRACT ID: T201109001.01 PROJECT(S): IM-N056(041)

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0480	301001 GRADED AGGREGATE BASE COURSE, TYPE B	220.000 CY				
0490	302005 DELAWARE NO. 57 STONE	555.000 TON				
0500	601190 PVC PIPE, 4"	60.000 LF				
0510	604001 PROTECTIVE SHIELD	LUMP	LUMP			
0520	604003 SHORING	LUMP	LUMP			
0530	605021 FURNISH STEEL H PILES, HP 12" X 53"	17000.000 LF				
0540	605071 FURNISH STEEL H INDICATOR OR TEST PILES, HP 12" X 53"	1320.000 LF				
0550	605121 INSTALL STEEL H PILES, HP 12" X 53"	17000.000 LF				
0560	605171 INSTALL STEEL H INDICATOR OR TEST PILES, HP 12" X 53"	1320.000 LF				
0570	605201 DYNAMIC PILE TESTING BY CONTRACTOR	16.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0580	610001 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT FOOTING, CLASS A	340.000 CY				
0590	610002 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A	440.000 CY				
0600	610003 PORTLAND CEMENT CONCRETE MASONRY, PIER FOOTING, CLASS A	410.000 CY				
0610	610004 PORTLAND CEMENT CONCRETE MASONRY, PIER ABOVE FOOTING, CLASS A	35.000 CY				
0620	610008 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	90.000 CY				
0630	610016 PORTLAND CEMENT CONCRETE MASONRY, CLASS D	60.000 CY				
0640	610018 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS D	245.000 CY				
0650	610500 ULTRA HIGH PERFORMANCE CONCRETE	1170.000 CF				
0660	611001 BAR REINFORCEMENT, EPOXY COATED	209000.000 LB				
0670	612500 PRECAST CONCRETE PIER CAP	100.000 CY				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0680	612501 PRECAST CONCRETE PIER COLUMN	38.000 CY				
0690	613000 EPOXY CONCRETE SEALER	2100.000 SF				
0700	613001 SILICONE-BASED ACRYLIC CONCRETE SEALER	13800.000 SF				
0710	615501 PREFABRICATED SUPERSTRUCTURE MODULES	LUMP		LUMP		
0720	615504 BRIDGE ELECTRICAL SYSTEM	LUMP		LUMP		
0730	624000 PREFABRICATED EXPANSION JOINT SYSTEM, 3"	146.000 LF				
0740	625501 POLYESTER POLYMER CONCRETE OVERLAY INSTALLATION	2375.000 SYIN				
0750	625502 FURNISH POLYESTER POLYMER CONCRETE OVERLAY	68.000 CY				
0760	707015 RIPRAP, R-4	290.000 TON				
0770	708003 GEOTEXTILES, RIPRAP	1050.000 SY				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0780	709000 PERFORATED PIPE UNDERDRAINS, 4"	230.000 LF				
0790	727007 BRIDGE SAFETY FENCE, TYPE 1	650.000 LF				
0800	807003 FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	340.000 LF				
0810	807006 RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	340.000 LF				
0820	807007 REFLECTOR PANELS	30.000 EACH				
0830	908004 TOPSOIL, 6" DEPTH	1750.000 SY				
0840	908014 PERMANENT GRASS SEEDING, DRY GROUND	1750.000 SY				
0850	908017 TEMPORARY GRASS SEEDING	1750.000 SY				
0860	908020 EROSION CONTROL BLANKET MULCH	1750.000 SY				
	SECTION 0002 TOTAL					

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0003 ROADWAY						
0870	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0880	202000 EXCAVATION AND EMBANKMENT	76825.000 CY				
0890	207000 STRUCTURAL EXCAVATION	22018.000 CY				
0900	207021 STRUCTURAL BACKFILL, (BORROW TYPE C)	2350.000 CY				
0910	208000 FLOWABLE FILL	208.000 CY				
0920	209001 BORROW, TYPE A	54118.000 CY				
0930	209005 FURNISHING BORROW, TYPE C FOR PIPE AND UTILITY TRENCH BACKFILL	10451.000 CY				
0940	209006 BORROW, TYPE F	146546.000 CY				
0950	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0960	301001 GRADED AGGREGATE BASE COURSE, TYPE B	36144.000 CY				

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			DOLLARS	CTS	DOLLARS	CTS
0970	301002 GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	1502.000 CY				
0980	302002 DELAWARE NO. 3 STONE	813.000 TON				
0990	302005 DELAWARE NO. 57 STONE	8000.000 TON				
1000	401005 SUPERPAVE TYPE C, PG 64-22 (CARBONATE STONE)	63.000 TON				
1010	401015 SUPERPAVE TYPE B, PG 70-22	22588.000 TON				
1020	401021 SUPERPAVE TYPE BCBC, PG 64-22	66999.000 TON				
1030	401029 SUPERPAVE TYPE C, PG 64-22, PATCHING	1411.000 TON				
1040	401030 SUPERPAVE TYPE B, PG 64-22, PATCHING	943.000 TON				
1050	401031 SUPERPAVE TYPE BCBC, PG 64-22, PATCHING	2353.000 TON				
1060	401037 SUPERPAVE TYPE B, PG 64-22, WEDGE	2105.000 TON				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1070	401045 SUPERPAVE TYPE C, PG 70-22 (NON-CARBONATE STONE)	25418.000 TON				
1080	401577 PAVER-LAID ULTRATHIN BITUMINOUS CONCRETE	22417.000 SY				
1090	501002 PORTLAND CEMENT CONCRETE PAVEMENT, 9"	17622.000 SY				
1100	501502 DIAMOND GRINDING PORTLAND CEMENT CONCRETE PAVEMENT AND PRECAST PAVEMENT	210184.000 SF				
1110	501503 PRECAST CONCRETE PAVEMENT PANELS	2844.000 SY				
1120	501511 RUBBLIZING PORTLAND CEMENT CONCRETE PAVEMENT	1110.000 SY				
1130	503006 DOWEL BARS	2808.000 EACH				
1140	503008 PATCHING PORTLAND CEMENT CONCRETE PAVEMENT, HIGH EARLY STRENGTH	1872.000 SY				
1150	504001 CRACK AND JOINT SEALING LESS THAN 3/4 INCH WIDE	5000.000 LF				
1160	601000 CLEANING DRAINAGE PIPE, 15"-24" DIAMETER	20.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1170	601001 CLEANING DRAINAGE PIPE, GREATER THAN 24" DIAMETER	70.000 LF				
1180	601011 REINFORCED CONCRETE PIPE, 15", CLASS III	11475.000 LF				
1190	601012 REINFORCED CONCRETE PIPE, 18", CLASS III	4687.000 LF				
1200	601013 REINFORCED CONCRETE PIPE, 21", CLASS III	1146.000 LF				
1210	601014 REINFORCED CONCRETE PIPE, 24", CLASS III	270.000 LF				
1220	601016 REINFORCED CONCRETE PIPE, 30", CLASS III	1264.000 LF				
1230	601018 REINFORCED CONCRETE PIPE, 36", CLASS III	239.000 LF				
1240	601032 REINFORCED CONCRETE PIPE, 15", CLASS IV	3758.000 LF				
1250	601033 REINFORCED CONCRETE PIPE, 18", CLASS IV	319.000 LF				
1260	601035 REINFORCED CONCRETE PIPE, 24", CLASS IV	192.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1270	601037 REINFORCED CONCRETE PIPE, 30", CLASS IV	74.000 LF				
1280	601039 REINFORCED CONCRETE PIPE, 36", CLASS IV	129.000 LF				
1290	601053 REINFORCED CONCRETE PIPE, 15", CLASS V	475.000 LF				
1300	601120 REINFORCED CONCRETE ELLIPTICAL PIPE, 29" X 45", CLASS IV	273.000 LF				
1310	601141 REINFORCED CONCRETE FLARED END SECTION, 15"	30.000 EACH				
1320	601142 REINFORCED CONCRETE FLARED END SECTION, 18"	12.000 EACH				
1330	601144 REINFORCED CONCRETE FLARED END SECTION, 24"	3.000 EACH				
1340	601146 REINFORCED CONCRETE FLARED END SECTION, 30"	2.000 EACH				
1350	601148 REINFORCED CONCRETE FLARED END SECTION, 36"	4.000 EACH				
1360	601175 REINFORCED CONCRETE FLARED END SECTION, 29"X45"	1.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1370	602003 DRAINAGE INLET, 34" X 24"	107.000 EACH				
1380	602004 DRAINAGE INLET, 48" X 30"	94.000 EACH				
1390	602005 DRAINAGE INLET, 48" X 48"	41.000 EACH				
1400	602006 DRAINAGE INLET, 66" X 30"	1.000 EACH				
1410	602007 DRAINAGE INLET, 66" X 48"	2.000 EACH				
1420	602008 DRAINAGE INLET, 66" X 66"	2.000 EACH				
1430	602009 DRAINAGE INLET, 72" X 24"	2.000 EACH				
1440	602010 DRAINAGE INLET, 72" X 48"	2.000 EACH				
1450	602011 DRAINAGE INLET, 72" X 72"	1.000 EACH				
1460	602012 DRAINAGE INLET, SPECIAL	3.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1470	602030 MANHOLE, 48" X 30"	2.000 EACH				
1480	602031 MANHOLE, 48" X 48"	5.000 EACH				
1490	602032 MANHOLE, 66" X 30"	1.000 EACH				
1500	602033 MANHOLE, 66" X 48"	1.000 EACH				
1510	602130 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	11.000 EACH				
1520	602132 ADJUSTING AND REPAIRING EXISTING MANHOLE	1.000 EACH				
1530	602505 PERSONAL SAFETY GRATE	2.000 EACH				
1540	606003 DRILLED SHAFT, 48"	914.000 LF				
1550	606004 DRILLED SHAFT, 60"	584.000 LF				
1560	606005 DRILLED SHAFT, 72"	44.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1570	607001 MECHANICALLY STABILIZED EARTH WALLS	LUMP	LUMP			
1580	607500 SOIL NAIL WALL	LUMP	LUMP			
1590	608001 STEEL SHEET PILES, PZ 27	20500.000 SF				
1600	610005 PORTLAND CEMENT CONCRETE MASONRY, SUBSTRUCTURE, CLASS A	305.000 CY				
1610	610008 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	120.000 CY				
1620	610017 PORTLAND CEMENT CONCRETE MASONRY, SUPERSTRUCTURE, CLASS D	375.000 CY				
1630	610509 CONCRETE CULVERT	LUMP	LUMP			
1640	611001 BAR REINFORCEMENT, EPOXY COATED	236000.000 LB				
1650	613001 SILICONE-BASED ACRYLIC CONCRETE SEALER	11350.000 SF				
1660	615515 RIDE SHELTER INSTALLATION	2.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1670	617000 STEEL SIGN STRUCTURE, TUBULAR ARCH, CANTILEVER	LUMP	LUMP			
1680	617001 STEEL SIGN STRUCTURE, TUBULAR ARCH, OVERHEAD	LUMP	LUMP			
1690	617515 HEADWALL	4.000 EACH				
1700	701012 PORTLAND CEMENT CONCRETE CURB, TYPE 1-6	287.000 LF				
1710	701013 PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	506.000 LF				
1720	701014 PORTLAND CEMENT CONCRETE CURB, TYPE 2	5754.000 LF				
1730	701016 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 1-4	457.000 LF				
1740	701017 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 1-6	206.000 LF				
1750	701019 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 2	27.000 LF				
1760	701020 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-2	1546.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
1770	701021 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-4	29116.000 LF				
1780	702000 TRIANGULAR CHANNELIZING ISLANDS	7719.000 SF				
1790	705001 PORTLAND CEMENT CONCRETE SIDEWALK, 4"	9281.000 SF				
1800	705002 PORTLAND CEMENT CONCRETE SIDEWALK, 6"	4471.000 SF				
1810	705005 PORTLAND CEMENT CONCRETE SIDEWALK, 8"	4836.000 SF				
1820	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	662.000 SF				
1830	705011 PEDESTRIAN CONNECTION	2385.000 SF				
1840	707001 RIPRAP, R-4	654.000 SY				
1850	707002 RIPRAP, R-5	701.000 SY				
1860	707015 RIPRAP, R-4	1.000 TON				

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			DOLLARS	CTS	DOLLARS	CTS
1870	708001 GEOTEXTILES, STABILIZATION	133380.000 SY				
1880	708003 GEOTEXTILES, RIPRAP	1644.000 SY				
1890	709001 PERFORATED PIPE UNDERDRAINS, 6"	17226.000 LF				
1900	709011 UNDERDRAIN OUTLET PIPE, 6"	565.000 LF				
1910	709017 UNDERDRAIN OUTLET	19.000 EACH				
1920	710500 INSTALLATION OF WATERMAIN AND ACCESSORIES	LUMP	LUMP			
1930	711500 ADJUST AND REPAIR EXISTING SANITARY MANHOLE	1.000 EACH				
1940	711501 SANITARY SEWER SYSTEM	LUMP	LUMP			
1950	720021 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	44247.000 LF				
1960	720022 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 2-31	60.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
1970	720023 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 3-31	1197.000 LF				
1980	720024 GUARDRAIL OVER CULVERTS, TYPE 1-31	23.000 EACH				
1990	720028 CURVED GUARDRAIL SECTION	418.000 LF				
2000	720035 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 2-27	60.000 LF				
2010	721001 GUARDRAIL END TREATMENT, TYPE 1-31, TEST LEVEL 3	13.000 EACH				
2020	721003 GUARDRAIL END TREATMENT, TYPE 2-31, TEST LEVEL 3	9.000 EACH				
2030	721004 GUARDRAIL END TREATMENT, TYPE 3-31	1.000 EACH				
2040	721006 END ANCHORAGE 31	34.000 EACH				
2050	721009 GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE 31)	24.000 EACH				
2060	721010 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31	26.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
2070	723003 PORTLAND CEMENT CONCRETE SAFETY BARRIER, PERMANENT, SINGLE FACE, 42"	5283.000 LF				
2080	723004 PORTLAND CEMENT CONCRETE SAFETY BARRIER, PERMANENT, DOUBLE FACE, 42"	196.000 LF				
2090	724004 PERMANENT IMPACT ATTENUATOR, TYPE 4	3.000 EACH				
2100	724005 PERMANENT IMPACT ATTENUATOR, TYPE 5	1.000 EACH				
2110	727000 CHAIN LINK FENCE	900.000 LF				
2120	727006 TEMPORARY CONSTRUCTION FENCE	682.000 LF				
2130	727506 RELOCATING FENCE	676.000 LF				
2140	760006 RUMBLE STRIPS, BITUMINOUS PAVEMENT	47445.000 LF				
2150	760007 RUMBLE STRIPS, CONCRETE	15100.000 LF				
2160	760010 PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT	188337.000 SYIN				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
2170	762000 SAW CUTTING, BITUMINOUS CONCRETE	29901.000 LF				
2180	762001 SAW CUTTING, CONCRETE, FULL DEPTH	30359.000 LF				
2190	763000 INITIAL EXPENSE/DE-MOBILIZATION	LUMP		LUMP		
2200	763001 BASELINE SCHEDULE	LUMP		LUMP		
2210	763002 MONTHLY UPDATE SCHEDULE	24.000 EAMO				
2220	763501 CONSTRUCTION ENGINEERING	LUMP		LUMP		
2230	763503 TRAINEE	1305.000 HOUR		0.80000		1044.00
2240	763598 FIELD OFFICE, SPECIAL I	36.000 EAMO				
2250	763652 CLASS 1 TOW TRUCK	2500.000 HOUR				
2260	763653 CLASS 2 TOW TRUCK	5.000 EACH				

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			DOLLARS	CTS	DOLLARS	CTS
2270	801000 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
2280	802003 ARROW PANELS TYPE C	996.000 EADY				
2290	803001 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	14356.000 EADY				
2300	804001 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY (FLOOD LIGHTS)	2905.000 EADY				
2310	805001 PLASTIC DRUMS	410420.000 EADY				
2320	806001 TRAFFIC OFFICERS	9500.000 HOUR	75.00000		712500.00	
2330	807001 FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, UNPINNED	9517.000 LF				
2340	807002 FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN BITUMINOUS PAVEMENT	7470.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
2350	807003 FURNISH AND INSTALL TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	16142.000 LF				
2360	807004 RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, UNPINNED	6117.000 LF				
2370	807005 RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN BITUMINOUS PAVEMENT	7530.000 LF				
2380	807006 RELOCATE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN CONCRETE	9008.000 LF				
2390	807010 REMOVE TEMPORARY PORTLAND CEMENT CONCRETE SAFETY BARRIER, PINNED IN BITUMINOUS PAVEMENT	5997.000 LF				
2400	807011 REMOVE TEMPORARY PORTLAND CEMENT CONCRETE BARRIER, PINNED IN CONCRETE	14322.000 LF				
2410	807501 TRAFFIC SEPARATORS	4545.000 LF				
2420	807502 REPLACE VERTICAL PANEL TRAFFIC SEPARATOR	1000.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
2430	808001 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE I	2000.000 EADY				
2440	808002 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	440.000 EADY				
2450	809001 INSTALL TEMPORARY IMPACT ATTENUATOR	65.000 EACH				
2460	809005 FURNISH TEMPORARY IMPACT ATTENUATOR - NON-GATING, REDIRECTIVE, TEST LEVEL 3	70.000 EACH				
2470	809006 RELOCATE TEMPORARY IMPACT ATTENUATOR	15.000 EACH				
2480	809007 FURNISH SAND CRASH CUSHION ARRAY	44.000 EACH				
2490	809008 INSTALL SAND CRASH CUSHION ARRAY	44.000 EACH				
2500	810001 TEMPORARY WARNING SIGNS AND PLAQUES	118208.000 EADY				
2510	811004 FLAGGER, NEW CASTLE COUNTY, HEAVY CONSTRUCTION, STATE	7200.000 HOUR				
2520	813001 TEMPORARY BARRICADES, TYPE III	114925.000 LFDY				

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			DOLLARS	CTS	DOLLARS	CTS
2530	813500 PEDESTRIAN CHANNELIZING BARRICADE SYSTEM	385.000 LFDY				
2540	817002 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, ALKYD-THERMOPLASTIC	12020.000 SF				
2550	817003 TEMPORARY MARKINGS, PAINT, 4"	5675.000 LF				
2560	817004 TEMPORARY MARKINGS, PAINT, SYMBOL/LEGEND	280.000 SF				
2570	817005 PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 5"	130.000 LF				
2580	817006 PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 12"	630.000 LF				
2590	817007 RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 12"	385.000 LF				
2600	817009 TEMPORARY MARKINGS, TAPE, 4"	78845.000 LF				
2610	817010 TEMPORARY MARKINGS, TAPE, WORDS/SYMBOLS	575.000 SF				
2620	817011 BLACKOUT TAPE, 8"	24985.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
2630	817013 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	613810.000 LF				
2640	817014 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"	17580.000 LF				
2650	817015 PREFORMED RETROREFLECTIVE THERMOPLASTIC MARKINGS, BIKE SYMBOL	18.000 EACH				
2660	817018 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"	9610.000 LF				
2670	817022 RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 8"	480.000 LF				
2680	817023 RETROREFLECTIVE PREFORMED PATTERNED MARKINGS, 13"	340.000 LF				
2690	817027 RAISED/RECESSED PAVEMENT MARKER	1760.000 EACH				
2700	817030 REMOVAL OF RAISED/RECESSED PAVEMENT MARKER HOUSING	1298.000 EACH				
2710	817031 REMOVAL OF PAVEMENT STRIPING	140060.000 SF				

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			DOLLARS	CTS	DOLLARS	CTS
2720	817032 REMOVAL OF PAVEMENT MARKING TAPE	44975.000 SF				
2730	818001 SUPPLY OF FLAT SHEET ALUMINUM SIGN PANEL, TYPE IV, RETROREFLECTIVE SHEETING	4643.000 SF				
2740	818006 SUPPLY OF EXTRUDED ALUMINUM SIGN PANEL, TYPE XI, RETROREFLECTIVE SHEETING	10795.000 SF				
2750	819004 GALVANIZED STEEL SIGN POST ONLY, 12' X 2"	401.000 EACH				
2760	819016 INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" DEPTH	30.000 EACH				
2770	819017 INSTALLATION OF 4" DIAMETER HOLE, GREATER THAN 6" DEPTH	32.000 EACH				
2780	819018 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	538.000 EACH				
2790	819019 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON MULTIPLE SIGN POSTS	3353.000 SF				

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			DOLLARS	CTS	DOLLARS	CTS
2800	820001 REINFORCED CONCRETE MASONRY SIGN FOUNDATION, W-6	28.000 EACH				
2810	820003 REINFORCED CONCRETE MASONRY SIGN FOUNDATION, W-10	2.000 EACH				
2820	820004 REINFORCED CONCRETE MASONRY SIGN FOUNDATION, W-12	2.000 EACH				
2830	820008 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-6	484.000 LF				
2840	820010 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-10	44.000 LF				
2850	820011 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-12	50.000 LF				
2860	820017 INSTALLATION OF BREAKAWAY I-BEAM SIGN POSTS	32.000 EACH				
2870	820018 REMOVAL OF BREAKAWAY I-BEAM SIGN POSTS	6.000 EACH				
2880	820019 INSTALL SIGN PANEL ON BREAKAWAY I-BEAM SIGN SUPPORT	1308.000 SF				
2890	820020 REMOVE SIGN PANEL ON BREAKAWAY I-BEAM SIGN SUPPORT	398.000 SF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
2900	821001 SUPPLY OF BARRIER MOUNTED SIGN SUPPORT, 4" POST	5.000 EACH				
2910	821003 INSTALLATION OF BARRIER MOUNTED SIGN SUPPORT	5.000 EACH				
2920	821005 INSTALLATION OF SIGN ON BARRIER MOUNTED SIGN SUPPORT	71.000 SF				
2930	822002 INSTALLATION OF SIGN ON/OVER HIGHWAY STRUCTURE	6638.000 SF				
2940	822003 REPOSITION EXISTING SIGN ON OVERHEAD STRUCTURE	292.000 SF				
2950	822009 REMOVAL OF SIGN ON/OVER HIGHWAY STRUCTURE	6367.000 SF				
2960	824001 BARRIER MOUNTED DELINEATOR	587.000 EACH				
2970	830001 CONDUIT JUNCTION WELL, TYPE 1, 20" X 20" PRECAST CONCRETE	150.000 EACH				
2980	830002 CONDUIT JUNCTION WELL, TYPE 4, 20" X 42-1/2" PRECAST CONCRETE	47.000 EACH				
2990	830003 CONDUIT JUNCTION WELL, TYPE 5, 24" X 16" PRECAST CONCRETE	5.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
3000	830004 CONDUIT JUNCTION WELL, TYPE 7, 36" X 60" PRECAST POLYMER CONCRETE	17.000 EACH				
3010	831009 FURNISH AND INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)	365.000 LF				
3020	831501 FURNISH AND INSTALL 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)	765.000 LF				
3030	831502 FURNISH AND INSTALL 3" SCHEDULE 80 PVC CONDUIT (OPEN CUT)	330.000 LF				
3040	831513 FURNISH AND INSTALL 2" SCHEDULE 80 PVC CONDUIT (TRENCH)	25.000 LF				
3050	831514 FURNISH AND INSTALL 2-1/2" SCHEDULE 80 PVC CONDUIT (TRENCH)	20.000 LF				
3060	831515 FURNISH AND INSTALL 3" SCHEDULE 80 PVC CONDUIT (TRENCH)	11855.000 LF				
3070	831516 FURNISH AND INSTALL 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	21355.000 LF				
3080	831523 FURNISH AND INSTALL 2" GALVANIZED CONDUIT (TRENCH)	6225.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
3090	831524 FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (TRENCH)	LF 1260.000				
3100	831525 FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (TRENCH)	LF 1540.000				
3110	831526 FURNISH AND INSTALL 4" GALVANIZED STEEL CONDUIT (TRENCH)	LF 645.000				
3120	831528 FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (BORE)	LF 1280.000				
3130	831529 FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (BORE)	LF 295.000				
3140	831530 FURNISH AND INSTALL 3" GALVANIZED STEEL CONDUIT (BORE)	LF 455.000				
3150	831531 FURNISH AND INSTALL 4" GALVANIZED STEEL CONDUIT (BORE)	LF 220.000				
3160	831533 FURNISH AND INSTALL 2" GALVANIZED STEEL CONDUIT (OPEN CUT)	LF 65.000				
3170	831539 FURNISH AND INSTALL 2-1/2" GALVANIZED STEEL CONDUIT (ON STRUCTURE)	LF 365.000				

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			DOLLARS	CTS	DOLLARS	CTS
3180	831544 FURNISH AND INSTALL 3" HDPE SDR-13.5 CONDUIT (BORE)	720.000 LF				
3190	831545 FURNISH AND INSTALL 4" HDPE SDR-13.5 CONDUIT (BORE)	4565.000 LF				
3200	831572 FURNISH AND INSTALL SECOND AND SUBSEQUENT ADDITIONAL 2-1/2" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT	35.000 LF				
3210	831573 FURNISH AND INSTALL SECOND AND SUBSEQUENT ADDITIONAL 3" SCHEDULE 80 PVC CONDUITS IN TRENCH OR OPEN CUT	70.000 LF				
3220	831574 FURNISH AND INSTALL SECOND AND SUBSEQUENT ADDITIONAL 4" SCHEDULE 80 PVC CONDUIT IN TRENCH OR OPEN CUT	1830.000 LF				
3230	832005 FURNISH AND INSTALL 1-CONDUCTOR #1 AWG STRNDED COPPER, TYPE USE-2	7065.000 LF				
3240	832006 FURNISH AND INSTALL 1-CONDUCTOR #2 AWG STRANDED COPPER, TYPE USE-2	32210.000 LF				
3250	832007 FURNISH AND INSTALL 1-CONDUCTOR #4 AWG STRANDED COPPER, TYPE USE-2	43680.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
3260	832008 FURNISH AND INSTALL 1-CONDUCTOR #6 STRANDED COPPER, TYPE USE-2	LF 88850.000				
3270	832035 REMOVAL OF CABLE FROM CONDUIT OR TRAFFIC /LIGHTING POLE	LF 89750.000				
3280	834001 POLE BASE, TYPE 3	EACH 9.000				
3290	834003 POLE BASE, TYPE 3B	EACH 4.000				
3300	834005 POLE BASE, TYPE 4A	EACH 10.000				
3310	834006 POLE BASE, TYPE 6	EACH 55.000				
3320	835002 CABINET BASE TYPE M	EACH 2.000				
3330	835003 CABINET BASE TYPE P	EACH 2.000				
3340	835004 CABINET BASE TYPE R	EACH 3.000				
3350	835500 FURNISH AND INSTALL ADDITIONAL DISCONNECT SWITCH	LF 2.000				

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			DOLLARS	CTS	DOLLARS	CTS
3360	839003 REMOVAL OF WOOD POLE	1.000 EACH				
3370	842501 FURNISH AND INSTALL ELECTRIC UTILITY SERVICE EQUIPMENT 120/240 (100 AMP)	6.000 EACH				
3380	843001 ELECTRICAL TESTING	LUMP	LUMP			
3390	846001 FURNISH AND INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN 1/4" FLEXIBLE TUBING IN A LOOP SAWCUT	2135.000 LF				
3400	846002 FURNISH AND INSTALL A 1-1/2 INCH GALVANIZED RIGID METAL CONDUIT DETECTOR SLEEVE WITH LOOP WIRE	215.000 LF				
3410	847006 LIGHTING CONTROL CABINET - 100A	4.000 EACH				
3420	850011 REMOVAL OF LUMINAIRE	51.000 EACH				
3430	850522 LUMINAIRE (LED), 400 WATTS, HPS EQUIVALENT	62.000 EACH				
3440	850523 LUMINAIRE (LED), 640 WATTS, HPS EQUIVALENT	76.000 EACH				

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			DOLLARS	CTS	DOLLARS	CTS
3450	851001 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE	20.000 EACH				
3460	851003 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 40' POLE	35.000 EACH				
3470	851531 HIGH MAST LIGHTING POLE	14.000 EACH				
3480	905001 SILT FENCE	9709.000 LF				
3490	905002 REINFORCED SILT FENCE	22699.000 LF				
3500	905005 INLET SEDIMENT CONTROL, CURB INLET	255.000 EACH				
3510	905006 INLET SEDIMENT CONTROL, CULVERT INLET	3.000 EACH				
3520	905500 SUPER SILT FENCE	5194.000 LF				
3530	906001 PORTABLE SEDIMENT TANK	1.000 EACH				
3540	906003 SUMP PIT	4.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
3550	907013 TEMPORARY SLOPE DRAIN, 18"	901.000 LF				
3560	907017 COMPOST FILTER LOGS	296.000 LF				
3570	908004 TOPSOIL, 6" DEPTH	140316.000 SY				
3580	908014 PERMANENT GRASS SEEDING, DRY GROUND	140316.000 SY				
3590	908015 PERMANENT GRASS SEEDING, STORMWATER	235.000 SY				
3600	908017 TEMPORARY GRASS SEEDING	140316.000 SY				
3610	908020 EROSION CONTROL BLANKET MULCH	124825.000 SY				
3620	908023 STABILIZED CONSTRUCTION ENTRANCE	1955.000 SY				
3630	908024 STABILIZED CONSTRUCTION ENTRANCE, TOPDRESSING	1500.000 TON				
3640	909005 STREAM DIVERSION	LUMP		LUMP		
3650	911000 PLANTINGS	LUMP		LUMP		

CANNOT BE USED FOR BIDDING

CONTRACT ID: T201109001.01 PROJECT(S): IM-N056(041)

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0003 TOTAL						
TOTAL BID						

CANNOT BE
USED FOR
BIDDING

BREAKOUT SHEET INSTRUCTIONS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: [T201109001.01 Breakout Sheet](#)

OR MAILED TO: [DELDOT](#)
[CONTRACT ADMINISTRATION](#)
[PO BOX 778, DOVER, DE 19903](#)

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.

BRIDGE 676, BREAKOUT SHEET - 1**CONTRACT NO. T201109001.01****Item 615504 - BRIDGE ELECTRICAL SYSTEM**

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	750	LF	Furnish & Install 3" Schedule 80 Rigid Polyvinyl Chloride (PVC) Conduit	\$	\$
2	3	EA	Barrier Mounted Junction Wells (NEMA-4X Rated)	\$	\$

TOTAL ITEM 615504 - BRIDGE ELECTRICAL SYSTEM \$
(LUMP SUM BID PRICE FOR ITEM 615504 - BRIDGE ELECTRICAL SYSTEM FOR **BRIDGE 676**)

BRIDGE 677, BREAKOUT SHEET - 2**CONTRACT NO. T201109001.01****Item 615504 - BRIDGE ELECTRICAL SYSTEM**

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	375	LF	Furnish & Install 2" Schedule 80 Rigid Polyvinyl Chloride (PVC) Conduit	\$	\$
2	375	LF	Furnish & Install 4" Schedule 80 Rigid Polyvinyl Chloride (PVC) Conduit	\$	\$
3	2	EA	Barrier Mounted Junction Wells (NEMA-4X Rated)	\$	\$

TOTAL ITEM 615504 - BRIDGE ELECTRICAL SYSTEM \$
(LUMP SUM BID PRICE FOR ITEM 615504 - BRIDGE ELECTRICAL SYSTEM FOR **BRIDGE 677**)

BREAKOUT SHEET - 3**CONTRACT NO. T201109001.01****Item 617000 - STEEL SIGN STRUCTURES, TUBULAR ARCH, CANTILEVER**

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	EA	Sign Structure SC1131 006 (CL-5)	\$	\$
2	1	EA	Sign Structure SC1055 (CL-6)	\$	\$
3	1	EA	Sign Structure SC1053 059 (CL-7)	\$	\$
4	1	EA	Sign Structure SC1135 006 (CL-8)	\$	\$

TOTAL ITEM 617000 - STEEL SIGN STRUCTURES, TUBULAR ARCH, CANTILEVER \$ _____
(LUMP SUM BID PRICE FOR ITEM 617000 - STEEL SIGN STRUCTURES, TUBULAR ARCH, CANTILEVER)

BREAKOUT SHEET - 4**CONTRACT NO. T201109001.01****Item 617001 - STEEL SIGN STRUCTURES, TUBULAR ARCH, OVERHEAD**

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	EA	Sign Structure SO1134 006 (OH-1)	\$	\$
2	1	EA	Sign Structure SO1133 006 (OH-3)	\$	\$
3	1	EA	Sign Structure SO1151 006 (OH-5)	\$	\$
4	1	EA	Sign Structure SO1282 059 (OH-6)	\$	\$
5	1	EA	Sign Structure SO1051 059 (OH-8)	\$	\$

TOTAL ITEM 617001 - STEEL SIGN STRUCTURES, TUBULAR ARCH, OVERHEAD \$ _____
(LUMP SUM BID PRICE FOR ITEM 617001 - STEEL SIGN STRUCTURES, TUBULAR ARCH, OVERHEAD)

Item 711501 - SANITARY SEWER SYSTEM

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	15	LF	4" SDR-21 PVC	\$	\$
2	175	LF	6" SDR-26 PVC	\$	\$
3	643	LF	15" SDR-26 PVC	\$	\$
4	332	LF	24" SDR-26 PVC	\$	\$
5	416	LF	27" X 3/8" Steel Casing Pipe (Jack and Bore)	\$	\$
6	1	EA	4" 45° Horizontal Bend	\$	\$
7	1	EA	6" Cleanout	\$	\$
8	1	EA	6" Pipe Cap	\$	\$
9	2	EA	14" Sewer Plug	\$	\$
10	2	EA	24" Sewer Plug	\$	\$
11	1	EA	6" Wye Connection	\$	\$
12	3	EA	60" Round Manhole	\$	\$
13	3	EA	60" Round Doghouse Manhole	\$	\$
14	1	EA	Connect to Existing Sewer Manhole	\$	\$
15	70	CY	Flowable Fill	\$	\$
16	1	EA	Bypass Pumping	\$	\$
17	1180	CY	Borrow Type "C"	\$	\$

TOTAL ITEM 711501 - SANITARY SEWER SYSTEM \$ _____
 (LUMP SUM BID PRICE FOR ITEM 711501 - SANITARY SEWER SYSTEM)

BREAKOUT SHEET - 6**CONTRACT NO. T201109001.01****Item 911000 - PLANTINGS**

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	7	EA	'CHEROKEE PRINCESS' FLOWERING DOGWOOD, 6', BB / #10 CONT.	\$	\$
2	11	EA	'JERSEY KNIGHT' AMERICAN HOLLY, 6', BB / #15CONT.	\$	\$
3	13	EA	'ROYAL STAR' STAR MAGNOLIA, 6', BB/ #10 CONT.	\$	\$
4	6	EA	SAUCER MAGNOLIA, 6', BB / #10 CONT.	\$	\$

TOTAL ITEM 911000 - PLANTINGS \$ _____
(LUMP SUM BID PRICE FOR ITEM 911000 - PLANTINGS)

USED FOR
BIDDING

BREAKOUT SHEET - 7
Item710500 - WATER SERVICES

CONTRACT NO. T201109001.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	622	LF	DUCTILE IRON PIPE CLASS 50, CEMENT LINED, 8"	\$	\$
2	784	LF	DUCTILE IRON PIPE CLASS 50, CEMENT LINED, 12"	\$	\$
3	294	LF	DUCTILE IRON PIPE CLASS 50, CEMENT LINED, 16"	\$	\$
4	4,089	LF	DUCTILE IRON PIPE CLASS 50, CEMENT LINED, 20"	\$	\$
5	3	EA	M.J. GATE VALVE, 8" WITH C.I. BOX AND COVER	\$	\$
6	393	LF	JACK AND BORE, 30"X3/8" STEEL CASING PIPE	\$	\$
7	355	LF	JACK AND BORE, 20"X3/8" STEEL CASING PIPE	\$	\$
8	365	LF	2" POLYETHYLENE SERVICE LINE, CLASS 160	\$	\$
9	9	EA	BUTTERFLY VALVE, 12" WITH C.I. BOX AND COVER	\$	\$
10	2	EA	BUTTERFLY VALVE, 16" WITH C.I. BOX AND COVER	\$	\$
11	12	EA	BUTTERFLY VALVE, 20" WITH C.I. BOX AND COVER	\$	\$
12	3	EA	GATE VALVE, 6"	\$	\$
13	1	EA	HYDRANT TEE, 8"X6"	\$	\$
14	2	EA	HYDRANT TEE, 12"X6"	\$	\$
15	3	EA	FIRE HYDRANT	\$	\$
16	3	EA	BLOW OFF ASSEMBLY, 2"	\$	\$
17	1	EA	BENDS 22 ½ DEGREES, 8"	\$	\$
18	6	EA	BENDS 45 DEGREES, 8"	\$	\$
19	4	EA	BENDS 11 ¼ DEGREES, 12"	\$	\$
20	13	EA	BENDS 45 DEGREES, 12"	\$	\$
21	2	EA	BENDS 90 DEGREES, 12"	\$	\$
22	6	EA	BENDS 11 ¼ DEGREES, 20"	\$	\$

BREAKOUT SHEET - 7
Item710500 - WATER SERVICES

CONTRACT NO. T201109001.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
23	4	EA	BENDS 22 ½ DEGREES, 20"	\$	\$
24	20	EA	BENDS 45 DEGREES, 20"	\$	\$
25	8	EA	BENDS 90 DEGREES, 20"	\$	\$
26	2	EA	TEE, 8"X8"	\$	\$
27	1	EA	TEE, 12"X12"	\$	\$
28	1	EA	TEE, 20"X8"	\$	\$
29	3	EA	TEE, 20"X12"	\$	\$
30	2	EA	TEE, 20"X20"	\$	\$
31	4	EA	M.J. PIPE CAP, 8"	\$	\$
32	1	EA	M.J. END CAP, 8" WITH 2" SERVICE CONNECTION TAP	\$	\$
33	3	EA	M.J. PIPE CAP, 12"	\$	\$
34	9	EA	M.J. PIPE CAP, 16"	\$	\$
35	1	EA	M.J. PIPE END CAP, 20"	\$	\$
36	4	EA	M.J. SLEEVE, 8"	\$	\$
37	5	EA	M.J. SLEEVE, 12"	\$	\$
38	1	EA	M.J. SLEEVE, 16"	\$	\$
39	3	EA	M.J. SLEEVE, 20"	\$	\$
40	2	EA	REDUCER, 8"X12"	\$	\$
41	1	EA	REDUCER, 12"X20"	\$	\$
42	3	EA	REDUCER, 16"X20"	\$	\$
43	1	EA	REMOVE EXISTING 12" CAP AND RESTRAINTS	\$	\$
44	3	EA	REMOVE EXISTING 20" CAP AND RESTRAINTS	\$	\$

BREAKOUT SHEET - 7
Item 710500 - WATER SERVICES

CONTRACT NO. T201109001.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
45	4	EA	CONCRETE ANCHOR	\$	\$
46	30	LF	24" STEEL CASING EXTENSION UNDER 295	\$	\$
47	1	EA	BENDS 90 DEGREES, 8"	\$	\$
48	34	LF	DUCTILE IRON PIPE CLASS 50, CEMENT LINED, 6"	\$	\$

TOTAL ITEM 710500 - WATER SERVICES \$
(LUMP SUM BID PRICE FOR ITEM 710500 - WATER SERVICES)

CANNOT BE
USED FOR
BIDDING

"ATTENTION"

TO BIDDERS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

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BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: **T201707005.01** Breakout Sheet

OR MAILED TO: DELDOT
CONTRACT ADMINISTRATION
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.



**AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM**

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite, including subcontractors, that complies with this regulation:

Contractor Name: _____

Contractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

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

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED, NOTARIZED, AND RETURNED WITH YOUR BID.

(This form is required from the prime contractor only, not required from subcontractors)

CERTIFICATION

Contract No. T201109001.01
Federal Aid Project No. IM-N056(041)

The undersigned bidder, _____
whose address is _____
and telephone number is _____ hereby certifies the following:

I/We have carefully examined the location of the proposed work, the proposed plans and specifications, and will be bound, upon award of this contract by the Department of Transportation, to execute in accordance with such award, a contract with necessary surety bond, of which contract this proposal and said plans and specifications shall be a part, to provide all necessary machinery, tools, labor and other means of construction, and to do all the work and to furnish all the materials necessary to perform and complete the said contract within the time and as required in accordance with the requirements of the Department of Transportation, and at the unit prices for the various items as listed on the preceding pages.

Bidder's Certification Statement [US DOT Suspension and Debarment Regulation (49 CFR 29)]:

NOTICE: All contractors who hold prime contracts (Federal Aid) with DeLDOT are advised that the prime contractor and subcontractors are required to submit to DeLDOT a signed and notary attested copy of the Bidder Certification Statement for each and every subcontract that will be utilized by the prime contractor. This Certification **must** be filed with DeLDOT prior to written approval being granted for each and every subcontractor. Copies of the Certification Form are available from the appropriate District Construction Office.

Under penalty of perjury under the laws of the United States, that I/We, or any person associated therewith in the capacity of (owner, partner, director, officer, principal, investigator, project director, manager, auditor, or any position involving the administration federal funds):

- a. am/are not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;
- b. have not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;
- c. do not have a proposed debarment pending; and,
- d. have not been indicted, convicted, or had a civil judgement rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted, indicate below to whom it applies, initiating agency, and dates of action. Providing false information may result in criminal prosecution or administrative sanctions.

(Insert Exceptions)

DBE Program Assurance:

NOTICE: In accordance with 49 CFR Part 26 the undersigned, a legally authorized representative of the bidder listed below, must complete this assurance.

By its signature affixed hereto, assures the Department that it will attain DBE participation as indicated:

Disadvantaged Business Enterprise _____ percent (blank to be filled in by bidder)



The foregoing quantities are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any such increase or decrease in the quantity for any item will not be regarded as a sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided in the contract.

Accompanying this proposal is a surety bond or a security of the bidder assigned to the Department of Transportation, for at least ten (10) percentum of total amount of the proposal, which deposit is to be forfeited as liquidated damages in case this proposal is accepted, and the undersigned shall fail to execute a contract with necessary bond, when required, for the performance of said contract with the Department of Transportation, under the conditions of this proposal, within twenty (20) days after date of official notice of the award of the contract as provided in the requirement and specifications hereto attached; otherwise said deposit is to be returned to the undersigned.

By submission of this proposal, each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

BIDDERS MUST ACKNOWLEDGE RECEIPT OF ALL ADDENDA

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____ 

Agreement to Accept Retainage

"Bidder acknowledges that if its Performance-Based Rating as defined in 29 Del.C. §6962 and section 2408 of Title 2 of Delaware's Administrative Code is below the required minimum threshold, as a condition to bid, Bidder acknowledges, consents and agrees to the Department withholding retainage of up to 5% from the monies due at the time of each progress payment under the contract." NEW

Sealed and dated this _____ day of _____ in the year of our Lord two thousand _____ (20____).

Name of Bidder (Organization)

Corporate
Seal

By: _____
Authorized Signature

Attest _____

Title

SWORN TO AND SUBSCRIBED BEFORE ME this _____ day of _____, 20_____.

Notary
Seal

Notary

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____
of _____ in the County of _____ and State of _____ as
Principal, and _____ of _____ in the County of
_____ and State of _____ as **Surety**, legally authorized to do business in the State of
Delaware ("**State**"), are held and firmly unto the **State** in the sum of _____
_____ Dollars (\$ _____), or _____ percent not to exceed _____
_____ Dollars (\$ _____) of amount of bid on Contract
No. T201109001.01, to be paid to the **State** for the use and benefit of its Department of Transportation
("**DeIDOT**") for which payment well and truly to be made, we do bind ourselves, our and each of our heirs,
executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal** who
has submitted to the **DeIDOT** a certain proposal to enter into this contract for the furnishing of certain
materiel and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and
truly enter into and execute this Contract as may be required by the terms of this Contract and approved by
the **DeIDOT**, this Contract to be entered into within twenty days after the date of official notice of the award
thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and
remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord
two thousand and _____ (20____).

SEALED, AND DELIVERED IN THE
presence of

Name of Bidder (Organization)

Corporate
Seal

By: _____
Authorized Signature

Attest _____

Title

Name of Surety

Witness: _____

By: _____

Title