

# STATE OF DELAWARE



This Copy is for information only.  
You must request a CD from  
DelDOT in order to bid.

## DEPARTMENT OF TRANSPORTATION

### BID PROPOSAL

for

CONTRACT T201903201.01

CTF Projects Central, FY19-21, Open End

Kent County

ADVERTISEMENT DATE: October 29, 2018

COMPLETION TIME: 1,095 Calendar Days

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 November 27, 2018

**Contract No.T201903201.01**

**CTF Projects Central, FY19-21, Open End  
Kent County**

**GENERAL DESCRIPTION**

LOCATION

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

DESCRIPTION

The improvements consist of furnishing all labor and materials for this contract. This project involves the improvement of roads and/or streets, drainage, sidewalks, and curbs located within the boundaries of Kent County and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION TIME

All work on this contract must be complete within 1,095 Calendar Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about January 19, 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](mailto: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 November 27, 2018 unless changed via addendum.
2. QUESTIONS regarding this project are to be e-mailed to [dot-ask@state.de.us](mailto: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 T201903201.01 in the subject line. Responses to inquiries are posted on-line at <http://www.bids.delaware.gov>.
3. THE BID PROPOSAL incorporates a cd containing **Expedite, version 5.9a** and its installation file. Bidders are to use the cd provided to enter their bid amounts into the Expedite file. The Expedite bid file must be printed and submitted in paper form along with the cd and other required documents prior to the Bid due date and time.
4. SURETY BOND - Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the bid.
5. DRUG TESTING - Regulation 4104; The state Office of Management and Budget has developed regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 Del.C. §6908(a)(6). **Refer to the full requirements by following the below link:** <http://regulations.delaware.gov/register/september2015/final/19%20DE%20Reg%20207%2009-01-15.htm>  
**Regulation was revised for projects advertised beginning 01/01/18.** Please review the revised regulation for details. Note a few of the requirements;
  - \* At bid submission - Each Contractor must submit with the bid *a single signed affidavit certifying that the Contractor and Subcontractor(s) has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program that complies with the regulation;*
  - \* At least Two business days prior to contract execution - The awarded Contractor shall provide to DelDOT copies of the Employee Drug Testing Program for the Contractor, and any other listed Subcontractors;
  - \* ~~Testing Report Forms shall be submitted to DelDOT monthly.~~ *No longer required.*
  - \* Subcontractors - Contractors that employ Subcontractors on the job site may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program along with the standard required subcontractor information. A Subcontractor shall not commence work until **DelDOT** has approved the subcontractor in writing;
  - \* Penalties for non-compliance are specified in the regulation.
6. NO RETAINAGE will be withheld on this contract.

7. EXTERNAL COMPLAINT PROCEDURE can be viewed on DelDOT's Website [here](#), or you may request a copy by calling (302) 760-2555.
8. REMINDER; A copy of your Delaware Business License must be submitted with your bid.
9. **PREVAILING WAGES DO NOT APPLY TO THIS PROJECT**, refer to *29 Del. C. § 6960 (m)*. Supplemental Specification Section 743.12 Basis of Payment, Paragraph F. Basis of Payment for Flagger – Item Nos. 743050 through 743073 does not apply to this project.
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. Concrete flatwork certification will be effective starting on June 1, 2018.
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. Funding guaranteed for first year only, must have legislative funding approval for following year extensions.
13. No utility relocation involvement is anticipated. Should any conflicts be encountered during construction requiring adjustment and/or relocation of the agencies' existing facilities, the necessary relocation work shall be accomplished by the respective agencies' forces, as directed by the District Engineer. Any adjustments and/or relocations of municipally owned facilities shall be done by the State's contractor in accordance with the respective agencies' standard specifications as directed by the District Engineer.
14. No utility relocation involvement is anticipated. Should any conflicts be encountered during construction requiring adjustment and/or relocation of the agencies' existing facilities, the necessary relocation work shall be accomplished by the respective agencies' forces, as directed by the District Engineer. Any adjustments and/or relocations of municipally owned facilities shall be done by the State's contractor in accordance with the respective agencies' standard specifications as directed by the District Engineer.
15. It is anticipated that all work will occur within DelDOT's existing right of way or easement areas. Should the need occur to trespass onto private property; it will be the responsibility of the Project manager to secure such trespass needs.
16. It is anticipated that all work will occur within DelDOT's right of way. Should the need occur to trespass onto railroad property, including the highway-rail crossing; it will be the responsibility of the Project Manager to contact the railroad Chief Engineer and obtain written authorization before entering.
17. The project manager shall be responsible for coordinating with the Traffic Section relating to any impacts to Traffic Section facilities (including but not limited to traffic loops, junction wells etc.) at least 4 weeks in advance of the start of the activity. Prior to initiating any work on this contract (or sites), the Project Manager shall be responsible for preparing and submitting for approval of the Safety Section, a Maintenance of Traffic Plan. Sufficient time shall be provided for the review and approval of the plan. The Maintenance of Traffic Plan shall include proposed time restrictions on the closure of travel lanes subject to the approval of the Safety Section.
18. The Project Manager is responsible for ensuring any required documents and analysis as part of the adopted Work Zone Safety and Mobility Procedures and Guidelines has been completed prior to any work starting on this contract.

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

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

\*Not used for units of measurement for payment.

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**GENERAL NOTICES**

SPECIFICATIONS:

The specifications entitled "Standard Specifications for Road and Bridge Construction, August, 2016", hereinafter referred to as the Standard Specifications, and Supplemental Specifications, the Special Provisions, notes on the Plans, this Bid Proposal, and any addenda thereto shall govern the work to be performed under this contract. The Specifications and any 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.

PREFERENCE FOR DELAWARE LABOR:

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

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

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

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

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

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

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

TAX CLEARANCE:

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

LICENSE:

A person desiring to engage in business in this State as a contractor shall obtain a license upon making application to the Division of Revenue.

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

(b) No agency shall accept a proposal for a public works contract unless such contractor has provided a proper and current copy of its occupational and/or business license, as required by Title 30, to such agency.

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

DIFFERING SITE CONDITIONS,

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

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

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

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice.

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

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

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

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

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

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

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

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

RIGHT TO AUDIT

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

# **SPECIAL PROVISIONS**

**401502 - ASPHALT CEMENT COST ADJUSTMENT**

For Sections 401, 402, and 403, 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 here](#).

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

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

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

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

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

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

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

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

**NOTE:**

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

5/05/15

**211500 - TREE REMOVAL, 6" TO 15" DIAMETER**  
**211501 - TREE REMOVAL, GREATER THAN 15" TO 25" DIAMETER**  
**211502 - TREE REMOVAL, GREATER THAN 25" TO 37" DIAMETER**  
**211503 - TREE REMOVAL, GREATER THAN 37" TO 49" DIAMETER**  
**211504 - TREE REMOVAL, GREATER THAN 49" DIAMETER**

**Description:**

This work consists of removing and disposing of trees with a diameter over 6".

**Construction Methods:**

The appropriate construction methods of Section 201 shall apply to this work. Final determination for removal of trees will be made by the Engineer during the construction operation.

Tree removal shall consist of cutting, bucking, and topping trees, the removal of stumps below the surrounding ground line, and the removal of all portions or remnants of the tree and stump from highway right-of-way and abutting properties. Trees shall be completely removed, including stumps and all roots or as directed by the engineer.

All portions or remnants of the tree shall become the property of the Contractor and shall be removed from the right-of-way and abutting properties at the close of each working day. All stumps, which cannot be removed the same day as cutting, shall be cut flush with the ground prior to the end of work that day. All right-of-way removal sites shall be restored to preconstruction condition, satisfactory to the Engineer, if ground disturbance, such as ruts or sod damage, occurs during removal in areas not to be disturbed by grading operations.

**Method of Measurement**

The quantity of trees for removal will be measured as the actual number of trees acceptably removed. The trunk diameter of the tree will be measured at a point 4' - 6" above the ground, and, in the case of multi-trunk trees, the diameter will be measured at the point immediately below the branching split or juncture regardless of the branching height above the ground. The diameter of the tree will be determined from the circumference of the tree as measured above.

**Basis of Payment:**

The quantity of trees designated for tree removal will be paid for at the Contract unit price per each tree by category, as follows:

- 6" to 15" Diameter
- Greater than 15" to 25" Diameter
- Greater than 25" to 37" Diameter
- Greater than 37" to 49" Diameter
- Greater than 49" Diameter

Trees with a diameter of 6" and under will be removed under Section 201. Price and payment will constitute full compensation for removal of designated trees; for restoration of ground disturbance in right-of-way removal sites; and for all labor, equipment, tools, and incidentals required to complete the work.

5/1/17

**211509 - TREE TRIMMING**

**Description:**

This work consists of pruning trees and disposing of the resulting trimmings in accordance with these specifications, notes and details on the Plans and as directed by the Engineer.

**Construction Method:**

Pruning shall be done in accordance with practices recommended by the International Society of Arboriculture in their publication Tree-Pruning Guidelines. (Edition current at time of advertisement).

The extent of the pruning shall be as noted and detailed on the Plans.

**Method of Measurement:**

The quantity of trees trimmed will be measured as the actual number of tree acceptably trimmed.

**Basis of Payment:**

The quantity of trees trimmed will be paid for at the Contract price per each tree. Price and payment will constitute full compensation for trimming, satisfactory disposal of trimmings, and for all labor, equipment, tools, and incidentals required to complete the work.

10/9/2018

**211510 - STUMP REMOVAL**

**Description:**

This work consists of removing existing stumps.

**Construction Methods:**

The appropriate construction methods of Section 201 shall apply to this work.

Stump removal shall consist of the complete removal of stumps to a depth of not less than 10 below the surrounding ground, utilizing an approved stump grinder.

Stump removal sites shall be raked and slightly mounded with wood chips and topsoil generated by the stump removal operation to allow for settlement. Excess wood chips and topsoil shall then be removed from the highway right of way.

Stumps scheduled for removal under this item will not exceed a height of 2 above the ground, measured vertically.

All right of way removal sites shall be restored to preconstruction condition, satisfactory to the Engineer, if ground disturbance such as ruts or sod damage occurs during stump removal operations in areas not to be disturbed by grading operations.

**Method of Measurement:**

The quantity of stump removal will be measured in feet. The diameter in feet will be determined at a height of 6 from ground level. The diameter of stumps that exist at a height of less than 6 will be measured on the face of the stump at the stump's widest point.

**Basis of Payment:**

The quantity of stump removal will be paid for at the Contract unit price per foot. Price and payment will constitute full compensation for removal of designated stumps; for restoration of ground disturbance in right of way removal sites; and for all labor, equipment, tools and incidentals required to do the work.

10/9/2018

**211511 – ROOT PRUNING**

**Description:**

This work shall consist of tree root pruning at the locations indicated on the plans, according to the Contract Documents, and as directed by the Engineer. Root Pruning shall be performed by a certified arborist or tree care specialist.

**Materials:**

The equipment to be used in the pruning of tree roots shall conform to the following:

A trenching machine, vibratory knife, rock saw, or other approved device shall be operated by the Contractor to prune tree roots.

**Construction Methods:**

The Contractor shall operate a trenching machine, vibratory knife, or rock saw along the outside limits of channel grading prior to any grading operations. This root pruning shall be to a depth of 30 inches, unless otherwise directed by the Engineer, and shall clean cut roots and minimize construction activity shock to the affected trees. When a trenching machine is used, the trench shall be immediately backfilled. Root pruning shall be performed prior to the installation of the Tree Protection Fencing and Signage.

Root pruning operations shall meet ANSI A300 standards for Tree Care Operations.

The Contractor is responsible for the removal and disposal of wood debris and other waste materials.

Trees which are immediately adjacent to the root pruning may be affected adversely due to their close proximity to the excavation. Removal of any such additional trees must receive the written concurrence of the Engineer.

Removal of any limbs of trees which may interfere with construction operations will also require the written concurrence of the Engineer.

**Method of Measurement:**

Tree Root Pruning shall be measured at the contract unit price per linear foot of cutting, as measured along planform ground surface cuts.

**Basis of Payment:**

Tree Root Pruning shall be paid for at the Contract unit price per linear foot of cutting. The payment will be full compensation for all labor, material, equipment, tools, and incidentals necessary to complete the work.

10/10/2018

**401500 – FOG SEAL**

**Description:**

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

**Materials:**

Materials for fog seal shall be a 1:1 mixture CSS-1h, which conforms to Section 1016 of the Standard Specifications, and water, which conforms to Section 1021 of the Standard Specifications. A Certificate of Analysis shall be submitted for each lot of CSS-1h for approval. The percentage of residual asphalt of the CSS-1h shall be no less than 57 percent. The emulsion should be diluted no more than 24 hours before its intended use. This is to avoid settlement of the diluted emulsion. The emulsion may be circulated using a centrifugal or other suitable pump to ensure uniformity.

**Equipment:**

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

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

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

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

Tanks shall have a minimum capacity of 750 gal.

The rate of application of the distributor shall be calibrated by an approved method determined by the Engineer. If the Engineer deems that the equipment applying the material is inadequate or fails to comply with all regulations, the Engineer will order the equipment to be removed from the job and require that another unit be placed on the work.

**Application of Fog Seal Material:**

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

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

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

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

**Construction Methods:**

The surface upon which the fog seal is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. The fog seal shall be applied at a rate of 0.05 to 0.17 gal/yd<sup>2</sup> at ambient temperature. The application rate appropriate for the surface being sealed shall be determined by the Engineer. This rate will be determined by test strip. Apply the fog seal when the air and surface temperature is 60°F and above. Measure the air and surface temperature in the shade away from artificial heat. The application shall not begin if rain or high winds are eminent. The Engineer will determine when weather conditions are suitable for application. The fog seal should be a thin, uniform coating sufficient to seal the underlying pavement. The fog seal shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. During the application of the fog seal, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Surface preparation shall be completed by removing all vegetation prior to sweeping with a power broom followed by a final sweeping with a approved vacuum truck. The preparation shall be done just prior to the application of the fog seal and be approved by the Engineer.

**Method of Measurement:**

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

1. **Truck Measurement:** If bituminous materials are delivered to the Project in tank trucks, distributor tanks, or drums, the Contractor shall not remove any bituminous material from the transporting vehicle or container until necessary measurements have been made, nor shall the transporting vehicle or container be released until final outage has been measured. If weighing is not convenient, the Contractor shall furnish the Engineer with a certified chart showing the dimensions and volume of each container together with a gauge or calibrated measuring rod which will permit the volume of the material to be determined by vertical measurement.
2. **Metering:** The volume may be determined by metering, in which case the metering device used and the method of using it shall be subject to the approval of the Engineer.
3. **Time of Deliveries:** The arrival and departure of vehicles delivering bituminous materials to the Project site shall be so scheduled that the Engineer is afforded proper time for the measurements of delivered volume and final outage. The Engineer will make the necessary measurements only during the Contractor's normal daily working hours.

**Basis of Payment:**

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

10/11/2018

**401506 - SPEED HUMP**

**Description:**

This work consists of furnishing all materials, constructing bituminous concrete speed hump and installing delineators at the location(s) shown on the Plans and/or directed by the Engineer.

**Materials:**

The materials required for the construction of speed hump shall be bituminous concrete Type C and shall conform to the requirements of Section 401, and for permanent striping, requirements of Section 817 of the Standard Specifications shall govern.

The delineator blank shall be 6 x 12 aluminum plate, alloy 6061 T651 or 5052 H32, 1/8 (min) in thickness with 1 1/2 radius corners, punched with two (2) 1/2 holes 2 from top and bottom, treated with a chromate conversion coating meeting ASTM B449.

Reflector shall be covered on one side only with Type III High Intensity grade silver retroreflective sheeting or other approved material with greater reflectivity.

The breakaway delineator post shall be composed of square steel tubes conforming to the notes and details shown on the Plans.

Pavement striping shall be alkyd-thermoplastic or an approved permanent pavement marking tape.

**Construction Method:**

The speed hump shall be constructed in accordance with the applicable requirements of Section 401. While the plans depict the construction of Speed Humps in two passes, the Department has obtained satisfactory results in constructing the speed hump through template ramps, which allow the placement of bituminous concrete in one pass. However, regardless of the method used, it shall be the responsibility of the Contractor to produce satisfactory results in constructing the speed hump in accordance with the details shown on the Plan.

One of the important requirements of this Contract is that the Contractor shall rotomill only those roadway pavement as required by the Plans within one residential community, or nearby communities without over extending the milling operation in one working day and shall return the following day to construct the speed humps at those locations milled on the previous day.

Two (2) reflectors per post are to be mounted back to back 4 from the ground with two (2) M10x1.5 grade 2 plated steel hex head bolts with two way steel lock nuts. Nylon washers are also to be used between the bolt or nut and the reflector face.

Within 48 hours of installation the speed hump shall be striped as specified in the Plan notes and details. If the Contractor elects to use temporary striping prior to the permanent pavement striping such temporary striping will be considered incidental to this item.

**Method of Measurement:**

The quantity of speed hump will be measured as the actual number of linear feet of speed hump constructed and accepted, measured between the two curb lines of the road.

**Basis of Payment:**

The quantity of speed hump will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for furnishing and placing all materials, saw cutting, pavement milling, furnishing and installing delineators as shown on the plans or as directed by the Engineer, permanent striping (Thermoplastic or tape as required by the plan), for all labor, equipment, tools and incidentals necessary to complete the work.

5/9/17

**401574 - PERVIOUS BITUMINOUS ASPHALT PAVEMENT**

**Description:**

A. GENERAL

1. This specification is intended to be used for pervious bituminous asphalt pavement along a shared use path.
2. This item includes pervious bituminous asphalt mix design, production, and installation. Pervious bituminous asphalt pavement refers to the compacted mix of modified asphalt, aggregate, and additives.
3. The primary requirements for the specifications of the mix are performance grade (PG) asphalt binder, binder content, binder draindown, aggregate gradation, air void content, retained tensile strength (TSR).

B. SUBMITTALS

1. Material Certificates: For each paving material, from manufacturer.
2. Material Test Reports: For each paving material.

C. QUALITY ASSURANCE

All the quality assurance shall be done in accordance with DelDOT's quality assurance specifications (Item 401699).

D. PROJECT CONDITIONS

1. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
  - a. Asphalt Course: Minimum surface temperature of 60° F at time of placement and ambient temperature above 50° F.
2. Imprinted Asphalt Paving: Proceed with coating imprinted pavement only when air temperature is at least 50° F and rising and will not drop below 50° F within 8 hours of coating application. Proceed only if no precipitation is expected within two hours after applying the final layer of coating.

**Materials:**

A. PERVIOUS ASPHALT MIX

1. Bituminous surface course for pervious paving shall be a minimum of 4 inches thickness with a bituminous mix of 5.75% to 6% by weight dry aggregate. In accordance with ASTM D6390, drain down of the asphalt binder shall be no greater than 0.3%. If more absorptive aggregates, such as limestone, are used in the mix, then the amount of bitumen shall be based on the testing procedures outlined in the National Asphalt Pavement Association's Information Series 131 – "Pervious Asphalt Pavements for Stormwater Management" (2008).
2. Use neat asphalt binder modified with elastomeric polymer fibers to produce a binder meeting the requirements of PG 76-22 as specified in AASHTO MP-1. The elastomer polymer shall be styrene-butadiene-styrene (SBS), or approved equal, applied at a rate of 3% by weight of the total binder. The composite materials shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified asphalt binder shall be heat and storage stable.

3. Hydrated lime shall be added at a dosage rate of 1.0% by weight of the total dry aggregate to mixes containing granite. Hydrated lime shall meet the requirements of ASTM C 977. The additive must be able to prevent the separation of the asphalt binder from the aggregate and achieve a required tensile strength ratio (TSR) of at least 80% on the asphalt mix when tested in accordance with NAPA IS131. The asphaltic mix shall be tested for its resistance to stripping by water in accordance with AASHTO T 283. If the estimated coating area is not above 95 percent, anti-stripping agents shall be added to the asphalt.
4. Pervious pavement shall not be installed on wet surfaces or when the ambient air temperature is 50° F or lower. The temperature of the bituminous mix shall be between 300° F and 350° F (based on the recommendations of the asphalt supplier).
5. Coarse Aggregate.
  - a. Coarse aggregate shall be that part of the aggregate retained on the No. 4 sieve. It shall consist of clean, tough, durable fragments of crushed stone, or crushed gravel of uniform quality throughout. Coarse aggregate shall be crushed stone or crushed gravel and shall have a percentage of wear as determined by AASHTO T96 of not more than 40 percent. In the mixture, at least 75 percent, by mass (weight), of the material coarser than the 4.75 mm (No. 4) sieve shall have at least two fractured faces, and 90 percent shall have one or more fractured faces (ASTM D5821). Coarse aggregate shall be free from clay balls, organic matter, deleterious substances, and not more than 8.0% of flat or elongated pieces as specified in ASTM D4791 with a value of 5:1.
6. Fine Aggregate.
  - a. The fine aggregate shall be that part of the aggregate mixture passing the No. 4 sieve. Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced by crushing stone or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls. The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than 6 and a liquid limit of not more than 25 when tested in accordance with ASTM D 4318.
7. Pervious Asphalt Mix Design Criteria.
  - a. The Contractor shall submit a mix design at least 10 working days prior to the beginning of production. The Contractor shall make available samples of coarse aggregate, fine aggregate, mineral filler, fibers and a sample of the Performance Graded Asphalt Binder (PGAB) that will be used in the design of the mixture. A certificate of analysis (COA) of the PGAB shall be submitted with the mix design. The COA shall be certified by a laboratory meeting the requirements of AASHTO R18. The Laboratory will be certified by the Delaware DOT or qualified under ASTM D3666. HMA Plant/Field Technicians shall be certified by the Mid-Atlantic Region Technician Certification Program (MARTCP) and the Delaware Technician Certification Program.
  - b. Bulk specific gravity (SG) used in air void content calculations shall not be determined and results will not be accepted using AASHTO T166 (saturated surface dry), since it is not intended for open graded specimens (>10% AV). Bulk SG shall be calculated using AASHTO T275 (paraffin wax) or ASTM D6752 (automatic vacuum sealing). Air void content shall be calculated from the bulk SG and maximum theoretical SG (AASHTO T209) using ASTM D3203.
  - c. The materials shall be combined and graded to meet the composition limits by mass (weight) as shown in the Table 2 below.

**Table 2. Pervious Asphalt Mix Design Criteria**

<b>Sieve Size (inch/mm)</b>	<b>Percent Passing (%)</b>
0.75/19	100
0.50/12.5	85 - 100
0.375/9.5	55 - 75
No.4/4.75	10 - 25
No.8/2.36	5 - 10
No.200/0.075 (#200)	2 - 4
Binder Content (AASHTO T164)	5.75 - 6%
Fiber Content by Total Mixture Mass	0.3% cellulose or 0.4% mineral
Rubber Solids (SBR) Content by Weight of the Bitumen	1.5-3% or TBD
Air Void Content (ASTM D6752/AASHTO T275)	16.0 - 22.0%
Draindown (ASTM D6390)*	<0.3%
Tensile Strength Ratio (AASHTO 283)**	>80%
Cantabro abrasion test on unaged samples (ASTM D7064-04)	<20%
Cantabro abrasion test on 7 day aged samples	<30%

\* Cellulose or mineral fibers may be used to reduce draindown.

\*\* If the TSR (retained tensile strength) values fall below 80% when tested per NAPA IS131 (with a single freeze thaw cycle rather than 5), then the contractor shall employ an antistripping additive, such as hydrated lime (ASTM C977) or a fatty amine, to raise the TSR value above 80%.

**B. PERVIOUS ASPHALT MIX PRODUCTION**

The pervious asphalt mix production shall meet the criteria set forth in Section 1014 of DelDOT's Standard Specifications and plant manufacturer's recommendations.

**C. AUXILIARY MATERIALS**

1. Paving Geotextile: nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.
2. Joint Sealant: ASTM D 6690 hot-applied, single-component, polymer-modified bituminous sealant.

**Construction Methods:**

The construction methods shall follow Section 401 of DelDOT's Standard Specifications except as noted below.

**A. Subbase Establishment**

1. No work shall be performed in this section until the aggregate subbase is 100% completed and accepted by the Engineer. Aggregate subbase is paid for under the individual items.

**B. Pervious Bituminous Asphalt Paving Installation**

1. Spreading and Finishing
  - a. The Pervious asphalt shall be placed either in a single application not to exceed 4 inches thick or in two lifts. If more than one lift is used, sufficient care shall be taken to insure that the Pervious asphalt layers join completely by keeping the time between layer placements minimal, keeping the first layer clear from dust and moisture, and minimizing traffic on the first layer.
  - b. The Contractor shall protect all exposed surfaces from damage during all phases of the pavement operation.

- c. No material shall be produced so late in the day as to prohibit the completion of spreading and compaction of the mixture during daylight hours, unless night paving has been approved for the project.
- d. No traffic shall be permitted on material placed until the material has been thoroughly compacted and has been permitted to cool to below 100 °F. The use of water to cool the pavement shall not be permitted. The Engineer reserves the right to require that all work adjacent to the pavement, such as fencing, grading, cleanup, and turf establishment, is completed prior to placing the pervious pavement when this work could cause damage to the pavement.

2. Compaction

- a. Make two passes with a standard asphalt pavement roller (5 ton minimum) operated in static mode. Do not over compact the material in order that permeability can be maintained.
- b. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture. The mixture shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of binder shall be removed and replaced. These replacements shall be at the Contractor's expense.
- c. The Contractor assumes full responsibility for the cost of repairing all damages that may occur to roadway, path or parking lot components and adjacent property if vibratory compaction equipment is used. After final rolling, no vehicular traffic of any kind shall be permitted on the surface until cooling and hardening has taken place, and in no case within the first 48 hours. For small batch jobs, curing can be considered to have occurred after the surface temperature is less than 100 °F. Provide barriers as necessary at no extra cost to the Owner to prevent vehicular use; remove at the discretion of the Engineer.

3. Surface Tolerances

- a. The surface will be tested by the Engineer using a straightedge at least 10 feet in length at selected locations parallel with the centerline. Any variations exceeding 1/8 inch between any two contact points shall be satisfactorily eliminated. The straightedge shall be provided by the Contractor.
- b. Work shall be done expertly throughout, without staining or injury to other work. Transition to adjacent pervious asphalt pavement shall be merged neatly with flush, clean lines. Finished pavement shall be even, without pockets, and graded to elevations shown on drawing.
- c. Installed pervious pavement shall not be used for equipment or materials storage during construction, and under no circumstances shall equipment be allowed to deposit soil on paved pervious surfaces.

4. Repair of Damaged Pavement

- a. Any existing pavement on or adjacent to the site that has been damaged as a result of construction work shall be repaired to the satisfaction of the Engineer without additional cost to the Owner.

C. Field Quality Control for Paving Operations

- 1. The full permeability of the pavement surface shall be tested by application of clean water at the rate of at least 5 gpm over the surface, using a hose or other distribution devise. Water used for the test shall be clean, free of suspended solids and deleterious liquids. The test shall be observed by the Engineer.
- 2. Check surface course for compliance with requirements for thickness and surface smoothness. Repair or remove and replace, at Contractor expense, unacceptable work as directed by the Engineer.

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

The unit of measurement for pervious asphalt pavement will be per Ton. Payment will be full compensation for preparation and installation of the pervious bituminous asphalt pavement, furnishing and installing all material including pervious asphalt, labor, equipment, supplies and incidentals to complete the work.

Excavation, Geotextile, Delaware No. 3, Delaware No. 8 and Delaware No. 57 infiltration stone shall be paid for under their respective items.

10/10/2018

**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 2000<sup>th</sup> ton target lot size is achieved during a production day, the lot size shall extend to the end of that production day. The Contractor may interrupt the production of one JMF in order to produce different material; this type of interruption will not alter the determination of the size or limits of material represented by a lot. The Engineer will evaluate each lot on a subplot basis. The size for each subplot shall be 100 to 500 tons and testing for the sub lots will be completed on a daily basis. For each subplot, the Engineer will evaluate one sample. The target size of sub-lots within each lot, except for the first sample of the production day, is equal-sized 500 ton sub lots and will be based upon anticipated production, however, more or fewer sublots, with differing sizes, may result due to the production schedule and conditions. If the actual production is less than anticipated, and it's determined a sample will not be obtained (based upon the anticipated tonnage), a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. If the actual production is going to be 50 tons or greater over the anticipated sub lot production, a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. The Engineer will combine the evaluation and test results for all of the applicable sublots in order to evaluate each individual lot.

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

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

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

**(b) Pavement Construction - Tests and Evaluations.**

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

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

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

<b>Table 2 - Material Parameter Weight Factors</b>		
<b>Material Parameter</b>	<b>Single Test Tolerance (+/-)</b>	<b>Weight Factor</b>
Asphalt Content	0.4	0.30
#8 Sieve ( $\geq 19.0$ mm)	7.0	0.30
#8 Sieve ( $\leq 12.5$ 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.

<b>Table 3 – Quality Level Analysis by the Standard Deviation Method</b>							
<b>PU or PL</b>	<b>QU and QL for “n” Samples</b>						
	<b>n = 3</b>	<b>n = 4</b>	<b>n = 5</b>	<b>n = 6</b>	<b>n = 7</b>	<b>n = 8</b>	<b>n = 9</b>
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53
99	-	1.47	1.67	1.80	1.89	1.95	2.00
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84
97	-	1.41	1.54	1.62	1.67	1.70	1.72
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63
95	-	1.35	1.44	1.49	1.52	1.54	1.55
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48
93	-	1.29	1.35	1.38	1.40	1.41	1.42
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12
86	1.04	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72

75	0.82	0.75	0.72	0.71	0.70	0.70	0.69
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66
73	0.75	0.69	0.66	0.65	0.64	0.63	0.63
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54
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 =  
 $((\text{Core Bulk Specific Gravity}) / (\text{Theoretical Maximum Specific Gravity})) \times 100\%$  recorded to the nearest 0.1%.
3. The average compaction for the sublots shall be averaged together for the compaction level of the lot. The lots compaction test level shall be averaged and recorded to the nearest whole percent.
4. Locate the value of the Payment Adjustment Factor corresponding to the calculated degree of compaction from Table 5 or Table 5a.
5. Determine the pavement construction price adjustment by using the following formula:  
Construction Pay adjustment = (Lot Quantity) x (Bid Price) x (Pay Adjustment Factor) x 30%.

<b>Table 5: Compaction Price Adjustment Highway Locations</b>		
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

<b>Table 5A: Compaction Price Adjustment Other<sup>1</sup> Locations</b>		
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

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

**.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:

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

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

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

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

**Example:**

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

Calculation:

For the Type B lift the calculation would be:

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

For the Type C lift the calculation would be:

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

11/3/14

**401756 - RUBBER MODIFIED FOG SEAL**

**Description:**

This work consists of preparing the surface, furnishing and applying Rubber Modified Fog Seal.

**Materials:**

Rubberized asphalt emulsion used for fog seal shall be manufactured with terminal blended rubber. The distillation residue of the emulsion shall contain a minimum of 10.0 rubber by weight, as determined by an analytical method approved by the Department. Residue by evaporation shall be greater than 33.0 percent. The emulsion supplier shall furnish the Department samples of the base asphalt (including rubber) used in the finished emulsion. A Certificate of Analysis shall be submitted for each lot of asphalt for approval.

In addition, the rubberized emulsion used for fog seal shall comply with the following:

<b><u>TEST</u></b>	<b><u>SPECIFICATION</u></b>	
Rubber content, %	of Residue	10% minimum
Uniformity Product shall be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.	ASTM D 2939.05	PASS
Viscosity, Krieb Unit (KU)	ASTM D 562	35 to 85
Specific Gravity	ASTM D 2939.07	Report
Residue by Evaporation	ASTM D 2939.08	>33.0%
Flash Point, °F (Residue)	ASTM D 93	>550
Resistance to Heat No sagging or slippage of film beyond the initial reference line after 212°F exposure for 2 hrs.	ASTM D 2939.14	PASS*
Resistance to Water No blistering or re-emulsification after 24 hr submersion in water.	ASTM D 2939.15	PASS*
Wet Flow No flow beyond initial reference line.	ASTM D 2939.19	PASS*
Direct Flame Test No continued combustion or slippage and run-down.	ASTM D 2939.20	PASS*
Wet Film Continuity A uniformly homogeneous consistency.	ASTM D 2939.22	PASS*
Resistance to Kerosene Report any evidence of leakage of kerosene, loss of adhesion and discoloration of tile.	ASTM D 2939.25	PASS*
Wet Track Abrasion Test 1/16 wet membrane application, 140 degree 24 hour cure, 1 hour water soak, 1500 gm rubber hose 5 minute scrub. Calculated weight loss, percentage of original volume.	ISSA (TB-100)	<1.5%
Accelerated Weathering Test No cracking, chipping, surface distortion or loss of adhesion. No color fading or lightening.	ASTM G 154	PASS @ 1,000 hours

1000 hours  
 UVA-340 lamp, 0.77 W/m<sup>2</sup> (v1.0 calibration),  
 8 hours UV light @ 50°C, 5 min. spray, 3:55 hours  
 condensation @ 50°C.

\* When testing the Rubber Asphalt Emulsion a ceramic tile panel will be incorporated in place of the metal panels. The ceramic tile panel preparation will be in accordance with Test Methods D 2939-25.1.1 guidelines: *Unglazed ceramic tiles, white, nonvitreous, dust-pressed body with an absorption range of 10 to 18% (determined in accordance with Test Methods C 67) approximately 6 by 6 inch by 3/8 to 1/2 inch in thickness to accommodate the mask.*

### **Surface Preparation:**

The surface upon which the Rubber Modified Fog Seal is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. Surface preparation shall be completed by removing all vegetation prior to sweeping with a power broom followed by a final sweeping with a approved vacuum truck, or flushed with a water pump-unit to remove dust, dirt, and debris. The pavement surface must be clean and dry before applying the fog seal. If flushing is required, it should be completed 24 hours prior to the application of the fog seal to allow for adequate drying. The preparation shall be done just prior to the application of the fog seal and be approved by the Engineer.

### **Equipment:**

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

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

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

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

Tanks shall have a minimum capacity of 750 gal.

The rate of application of the distributor shall be calibrated by an approved method determined by the Engineer. If the Engineer deems that the equipment applying the material is inadequate or fails to comply with all regulations, the Engineer will order the equipment to be removed from the job and require that another unit be placed on the work.

**Application of Rubber Modified Fog Seal Material:**

The Rubber Modified Fog Seal shall be applied in one application at the rates specified using the pressure distributor for the full width of the sealing operation, unless otherwise directed. Apply at the temperature that is recommended by the manufacture. The nozzles of the spray bar shall be kept clean at all times. If one or more nozzles become blocked during the application of bituminous materials, the distributor shall be stopped immediately, and the nozzles shall be cleaned. The streaked areas shall be made uniform using a hand hose or other approved methods.

If the Contractor is unable to keep the application uniform, the operation shall be discontinued until a more experienced operator or a better distributor, or both, can be provided; or, the Contractor shall take such other precautions as may be necessary to keep the application within specified limits. When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or curbs from discoloration.

**Construction Methods:**

The Rubber Modified Fog Seal shall be applied at a rate of 0.05 to 0.17 gal/yd<sup>2</sup> at ambient temperature. The application rate appropriate for the surface being sealed shall be determined by the Engineer. This rate will be determined by test strip. Apply the Rubber Modified Fog Seal when the air and surface temperature is 60 F and above. Measure the air and surface temperature in the shade away from artificial heat. The application shall not begin if rain or high winds are eminent. The Engineer will determine when weather conditions are suitable for application. The fog seal should be a thin, uniform coating sufficient to seal the underlying pavement. The Rubber Modified Fog Seal shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. During the application of the fog seal, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures.

**Method of Measurement:**

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

1. **Truck Measurement:** If bituminous materials are delivered to the Project in tank trucks, distributor tanks, or drums, the Contractor shall not remove any bituminous material from the transporting vehicle or container until necessary measurements have been made, nor shall the transporting vehicle or container be released until final outage has been measured. If weighing is not convenient, the Contractor shall furnish the Engineer with a certified chart showing the dimensions and volume of each container together with a gauge or calibrated measuring rod which will permit the volume of the material to be determined by vertical measurement.
2. **Metering:** The volume may be determined by metering, in which case the metering device used and the method of using it shall be subject to the approval of the Engineer.
3. **Time of Deliveries:** The arrival and departure of vehicles delivering bituminous materials to the Project site shall be so scheduled that the Engineer is afforded proper time for the measurements of delivered volume and final outage. The Engineer will make the necessary measurements only during the Contractor's normal daily working hours.

**Basis of Payment:**

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

**401758 - COAL SLAG**

**Description:**

This work consists of preparing the surface, furnishing and applying Coal Slag on Rubber Modified Asphalt.

**Materials:**

*Aggregate*

The sand product mentioned here on shall be coal slag abrasives meeting the following requirements:

<b><u>Property</u></b>	<b><u>Requirement</u></b>
Particle Shape	Angular, Sharp
Hardness	>6 on the Moh's scale
Solubility	Insoluble
Color	Black
Particle Size	Should be approved by the department

**Equipment:**

Sand Spreader. The sand spreader used shall be capable of uniformly applying the sand product to the liquid asphalt. Devices to control the volume and application rate shall be provided. Each spreader shall conform to the following:

- a. *Variable Speed Controller (VSC)*. All distributors shall be provided with an approved VSC applying feet per minute with a tabulation of feet per load with adjustments. Each load tabulation shall start at zero. There shall also be a totaling tabulation by the contractor.
- b. *Rate Control System*. All sand spreaders shall be equipped with an auger designed to maintain an even broadcast of sand product
- c. *Tests*. Necessary tests shall be made to determine the accuracy of all VSC and auger efficiencies. The tests shall be made by the Contractor when and as required by the Engineer.

Hopper shall have a minimum capacity of 11 cu ft.

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

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

**Application:**

The Coal Slag friction material shall be applied immediately to coincide with application of the Rubberized Asphalt Emulsion such that the friction material is imbedded before the emulsion begins to break. Application shall be accomplished using an approved broadcast spreader mounted on the rear of the emulsion distributor, and apply material evenly across the full width of the spray bar. The spreader unit must be done in such a manner as to prevent driving on the freshly applied Rubberized Asphalt Emulsion sealed areas. Contractor shall schedule this work so the Rubberized Asphalt Emulsion seal application and the spreading operation work as a cohesive unit with the spreading from the rear of the emulsion distributor. Spreading will be done in a manner so as to prevent excess material from broadcasting onto adjacent pavement prior to the Rubberized Asphalt Emulsion seal being applied.

The Coal Slag shall be applied in one application at the rates specified using the VSC for the full width of the sealing operation, unless otherwise directed.

The spinner disk shall be kept clean at all times. Spreaders that spread a minimum of 30' are recommended. If spinner disk becomes blocked during the application of the sand product, the distributor shall be stopped immediately, and the spinner disk shall be cleaned.

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

**Construction Methods:**

The application rate of the Coal Slag friction material shall be between 0.50 to 3.00 pounds per square yard. These rates will be verified by application of a test strip and approved by the Engineer. The Engineer will determine when weather conditions are suitable for application. The Coal Slag should be a uniform coating sufficient to cover the liquid asphalt. The Coal Slag shall be applied using sand product spreading equipment with a spinning disk or other approved distribution system.

**Method of Measurement:**

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

**Basis of Payment:**

The quantity of the Coal slag used in sand seal shall be measured in pounds. Price and payment will constitute full compensation for preparing the surface, mobilizing and furnishing all equipment, materials, and labor; placing the material; and for all labor, equipment, tools and incidentals necessary to complete the work.

10/10/2018

**401760 - FOG SEAL WITH CURBING**

**Description:**

This specification is for specific use on roads within subdivisions. The work consists of preparing the surface, protecting the concrete areas (i.e. curbs, gutters, sidewalks, and driveways) tightly monitoring the traffic on the roads and individual driveways to prevent product to transfer onto the concrete surfaces, furnishing and applying an emulsified asphalt and water mixture as a surface seal.

**Materials:**

Materials for fog seal shall be a 1:1 mixture CSS-1h, which conforms to Section 1016 of the Standard Specifications, and water, which conforms to Section 1021 of the Standard Specifications. A Certificate of Analysis shall be submitted for each lot of CSS-1h for approval. The percentage of residual asphalt of the CSS-1h shall be no less than 57 percent. The emulsion should be diluted no more than 24 hours before its intended use. This is to avoid settlement of the diluted emulsion. The emulsion may be circulated using a centrifugal or other suitable pump to ensure uniformity.

**Surface Preparation:**

The surface upon which the Fog Seal is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. Surface preparation shall be completed by removing all vegetation prior to sweeping with a power broom followed by a final sweeping with an approved vacuum truck, or flushed with a water pump-unit to remove dust, dirt, and debris. The pavement surface must be clean and dry before applying the fog seal. If flushing is required, it should be completed 24 hours prior to the application of the fog seal to allow for adequate drying. The preparation shall be done just prior to the application of the fog seal and be approved by the Engineer.

**Equipment:**

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

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

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

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

Tanks shall have a minimum capacity of 750 gal.

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

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

**Application of Fog Seal Material:**

The fog seal shall be applied in one application at the rates specified using the pressure distributor for the full width of the sealing operation, unless the Engineer directs otherwise. Handwork will be considered adjacent to concrete areas. Apply at the temperature that is recommended by the manufacturer.

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

If the Contractor is unable to keep the application uniform, the operation shall be discontinued until a more experienced operator or a better distributor, or both, can be provided; or, the Contractor shall take such other precautions as may be necessary to keep the application within specified limits. When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or concrete areas of curb, gutter, sidewalks, and driveways from discoloration. Discoloration can occur because of either the nozzles' spray or vehicles' tires tracking the product.

**Construction Methods:**

The fog seal shall be applied at a rate of 0.05 to 0.17 gal/yd<sup>2</sup> at ambient temperature. The application rate appropriate for the surface being sealed shall be determined by the Engineer. This rate will be determined by test strip. The tests will continue to the satisfaction of the Engineer. Apply the fog seal when the air temperature is 60 F and rising and the surface temperature is 60°F and above. Measure the air and surface temperature in the shade away from artificial heat. The application shall not begin if rain or high winds are eminent. The Engineer will determine when weather conditions are suitable for application. The fog seal should be a thin, uniform coating sufficient to seal the underlying pavement. The fog seal shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. During the application of the fog seal, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Staging areas will not be within the subdivision and must be coordinated with the Engineer.

**Method of Measurement:**

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

- 1. Truck Measurement: If bituminous materials are delivered to the Project in tank trucks, distributor tanks, or drums, the Contractor shall not remove any bituminous material from the transporting vehicle or container until necessary measurements have been made, nor shall the transporting vehicle or container be released until final outage has been measured. If weighing is not

convenient, the Contractor shall furnish the Engineer with a certified chart showing the dimensions and volume of each container together with a gauge or calibrated measuring rod, which will permit the volume of the material to be determined by vertical measurement.

2. Metering: The volume may be determined by metering, in which case the metering device used and the method of using it shall be subject to the approval of the Engineer.
3. Time of Deliveries: The arrival and departure of vehicles delivering bituminous materials for the Project site shall be so scheduled that the Engineer is afforded proper time for the measurements of delivered volume and final outage. The Engineer will make the necessary measurements only during the Contractor's normal daily working hours.

**Basis of Payment:**

The quantity of the fog seal will be paid for at the Contract unit price per gallon of diluted CSS-1h. Price and payment will constitute full compensation for preparing the surface, protecting the surfaces that do not receive fog seal, mobilizing and furnishing all equipment, materials, and labor; placing the material; and for all labor, equipment, tools and incidentals necessary to complete the work.

10/10/2018

**401761 - RUBBER MODIFIED FOG SEAL WITH CURBING**

**Description:**

This specification is for specific use on roads within subdivisions. The work consists of preparing the surface, protecting the concrete areas (i.e. curbs, gutters, sidewalks, and driveways) tightly monitoring the traffic on the roads and individual driveways to prevent product to transfer onto the concrete surfaces, furnishing and applying an rubberized emulsified asphalt and water mixture as a surface seal.

**Materials:**

Rubberized asphalt emulsion used for fog seal shall be manufactured with terminal blended rubber. The distillation residue of the emulsion shall contain a minimum of 10.0 percent rubber by weight, as determined by an analytical method approved by the Department. Residue by evaporation shall be greater than 33.0 percent. The emulsion supplier shall furnish the Department samples of the base asphalt (including rubber) used in the finished emulsion. A Certificate of Analysis shall be submitted for each lot of asphalt for approval.

In addition, the rubberized emulsion used for fog seal shall comply with the following:

<b><u>TEST</u></b>	<b><u>SPECIFICATION</u></b>	
Rubber content, %	of Residue	10% minimum
Uniformity	ASTM D 2939.05	PASS
Product shall be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.		
Viscosity, Krieb Unit (KU)	ASTM D 562	35 to 85
Specific Gravity	ASTM D 2939.07	Report
Residue by Evaporation	ASTM D 2939.08	>33.0%
Flash Point, °F (Residue)	ASTM D 93	>550
Resistance to Heat	ASTM D 2939.14	PASS*
No sagging or slippage of film beyond the initial reference line after 212 °F exposure for 2 hrs.		
Resistance to Water	ASTM D 2939.15	PASS*
No blistering or re-emulsification after 24 hr submersion in water.		
Wet Flow	ASTM D 2939.19	PASS*
No flow beyond initial reference line.		
Direct Flame Test	ASTM D 2939.20	PASS*
No continued combustion or slippage and run-down.		
Wet Film Continuity	ASTM D 2939.22	PASS*
A uniformly homogeneous consistency.		
Resistance to Kerosene	ASTM D 2939.25	PASS*
Report any evidence of leakage of kerosene, loss of adhesion and discoloration of tile.		
Wet Track Abrasion Test	ISSA (TB-100)	<1.5%
1/16 wet membrane application, 140 degree 24 hour cure, 1 hour water soak, 1500 gm rubber hose 5 minute scrub. Calculated weight loss, percentage of original volume.		
Accelerated Weathering Test	ASTM G 154	PASS @ 1,000 hours
No cracking, chipping, surface distortion or loss of adhesion. No color fading or lightening.		

1000 hours  
UVA-340 lamp, 0.77 W/m<sup>2</sup> (v1.0 calibration),  
8 hours UV light @ 50 °C, 5 min. spray, 3:55 hours  
condensation @ 50 °C.

\* When testing the Rubber Asphalt Emulsion a ceramic tile panel will be incorporated in place of the metal panels. The ceramic tile panel preparation will be in accordance with Test Methods D 2939-25.1.1 guidelines: *Unglazed ceramic tiles, white, nonvitreous, dust-pressed body with an absorption range of 10 to 18% (determined in accordance with Test Methods C 67) approximately 6 by 6 inch in area and 3/8- to 1/2-inch in thickness to accommodate the mask.*

### **Surface Preparation:**

The surface upon which the Rubber Modified Fog Seal is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. Surface preparation shall be completed by removing all vegetation prior to sweeping with a power broom followed by a final sweeping with an approved vacuum truck, or flushed with a water pump-unit to remove dust, dirt, and debris. The pavement surface must be clean and dry before applying the fog seal. If flushing is required, it should be completed 24 hours prior to the application of the fog seal to allow for adequate drying. The preparation shall be done just prior to the application of the fog seal and be approved by the Engineer.

### **Equipment:**

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

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

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

- f. *Tests.* Necessary tests shall be made to determine the accuracy of all pressure gauges, tachometers, and pump efficiencies. The tests shall be made by the Contractor when and as the Engineer requires.
- g. *Spray Bars.* Each distributor shall be equipped with spray bars capable of applying material uniformly throughout the entire length of the spray bars when they are extended. Spray bar extensions shall be provided for applying up to a 12' width in one operation. Spray bars shall be equipped with a cleaning device and a shut-off valve to prevent dribbling, dripping, or streaking.

- h. *Tank Capacity Gauge.* A float or other approved type tank capacity gauge shall be furnished to indicate the volume in the tank in not less than 25 gal units. The gauge shall have adjustments for correction.

Tanks shall have a minimum capacity of 750 gal.

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

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

#### **Application of Rubber Modified Fog Seal Material:**

The Rubber Modified Fog Seal shall be applied in one application at the rates specified using the pressure distributor for the full width of the sealing operation, unless the Engineer directs otherwise. Handwork will be considered adjacent to concrete areas. Apply at the temperature that is recommended by the manufacturer.

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

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

When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or concrete areas of curb, gutter, sidewalks, and driveways from discoloration. Discoloration can occur because of either the nozzles' spray or vehicles' tires tracking the product.

#### **Construction Methods:**

The Rubber Modified Fog Seal shall be applied at a rate of 0.05 to 0.17 gal/yd<sup>2</sup> at ambient temperature. The application rate appropriate for the surface being sealed shall be determined by the Engineer. This rate will be determined by test strip. Apply the fog seal when the air temperature is 60 F and rising and the surface temperature is 60°F and above. Measure the air and surface temperature in the shade away from artificial heat. The application shall not begin if rain or high winds are eminent. The Engineer will determine when weather conditions are suitable for application. The fog seal should be a thin, uniform coating sufficient to seal the underlying pavement. The Rubber Modified Fog Seal shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. During the application of the fog seal, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Staging areas will not be within the subdivision and must be coordinated with the Engineer.

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

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

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

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

**Basis of Payment:**

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

4/7/16

**601504 - PERSONNEL GRATE FOR PIPE INLET**

**Description:**

This work consists of furnishing all materials, fabricating, delivering and constructing personal grates for pipe inlets as shown on the details on the Plans, as directed by the Engineer and as required by these Special Provisions.

**Materials:**

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

Working drawings shall be submitted in accordance with Subsection 105.04.

**Construction Methods:**

Personal grates for pipe inlets shall be constructed based on the details shown on the Plans and at the size and locations shown on the Plans.

**Method of Measurement:**

The quantity of personal grate for pipe inlet will not be measured.

**Basis of Payment:**

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

**Note:**

The breakout sheet attached to the Bid Proposal shows all personnel grate for pipe inlets proposed for this Contract. The Contractor shall fill in the per each unit price and the cost (unit price times the proposed quantity) for each size listed. The lump sum price bid for item 601504-Personal Grate for Pipe Inlet shall be in the sum of the total cost for all sizes listed. The completed breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet will result in the Bid Proposal as being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract the furnishing and installing of one or more of the sizes listed and the right to add or subtract from the quantity of each size listed. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation to the Contractor if such additions and/or deletions are made.

2/22/2018

**760503 - PAVEMENT MILLING, PATCHING**

**Description:**

This work consists of milling the existing bituminous concrete pavement patch areas at the locations and to the depths shown on the Plans and/or as directed by the Engineer.

**Construction Methods:**

Section 760 Pavement Milling of the Standard Specifications shall be applicable to this item, except the milled patch areas must be paved with material designated on the Plans flush with the adjacent pavement prior to opening to traffic.

**Method of Measurement:**

The quantity of pavement milling, patching will be measured as the number of square yards per inch of depth shown on the Plans or as directed by the Engineer. Any additional depth, not approved by the Engineer in writing, will not be measured.

**Basis of Payment:**

The quantity of pavement-milling will be paid for at the Contract unit price per square yard per inch of depth. Price and payment will constitute full compensation for milling or planning the existing pavement; for removing and disposing of the milled material; and for all labor, tools, equipment, and incidentals required to complete the work.

10/10/2018

**763587 – MAN HOUR OF MISCELLANEOUS WORK**

**Description:**

This work consists of clearing, grubbing and disposing of selected trees (regardless of size), shrubs, brush and other vegetation and disposal of all vegetation and debris within the limits of the areas that have been designated and as directed by the Engineer. Any trash or rubbish in the designated areas shall be removed and disposed of as part of this operation. This work also includes the preservation from injury or defacement all vegetation and trees selected to remain and as directed by the Engineer.

**Construction Methods:**

**Field Meeting.** Prior to commencing the clearing and grubbing operation, the Contractor must hold a field meeting with DelDOT North District, the designer, and the Construction Inspecting firm to clarify the limits of herbicidal treatment and clearing and grubbing.

**General.** The contractor shall remove only material as directed and as determined during the field meetings. If the Contractor chooses to do such work with mechanical equipment, he must ensure that the slope is suitable for the safe operation of such equipment. For areas where the slope is determined to be too steep for the safe operation of mechanical equipment, the contractor shall conduct the clearing and grubbing operations using necessary hand equipment. The contractor must use all necessary precautions and fall protection to ensure the safety of all workers and the general public.

All arboriculture practices for tree care operations shall be conducted in accordance with ANSI Z133.1 as prepared by the International Society of Arboriculture.

The Contractor shall be solely responsible for all liability or damage including but not limited to damage to existing sidewalks, curbs, gutters, fences, guardrail, and utilities caused by or connected with the removal operations.

To conduct clearing and grubbing operations, the contractor should use the existing fence gates to access the sites whenever feasible. The Contractor should inform the Engineer if any gate is locked. The Contractor might find it necessary at some sites to roll back or remove a section of existing chain link fence to access the job site. The Contractor must re-connect the fence at the end of the day to secure the site. Rolling back and reconnecting the existing fence will be incidental to clearing and grubbing. Repair of the fence as approved by the engineer will be incidental to clearing and grubbing.

**Maintenance of Traffic.** The contractor must install maintenance of traffic control measures as required, or as directed by the Engineer prior to all clearing and grubbing operations.

**Trees Designated to be removed or remain.** Certain areas have been designated and tagged for the trees to remain. Other areas have been designated and tagged for the trees to be removed. The limits of the clearing and grubbing shall be as discussed and as clarified during the field meeting.

The Contractor shall protect all trees, shrubs and plants designated to remain. Any trees, shrubbery or plants designated to remain that are damaged shall be replaced or repaired by a certified tree surgeon. If pruning is determined necessary to avoid impacts to adjacent trees to remain, all pruning shall be in accordance with the International Society of Arboriculture's current Tree Pruning Guideline, Publication ISBN 1-881956-07-5 and as illustrated on the Standard Construction Details.

**Tree Removals and Trimming.** Any tree designated for removal that has been verified during the field meeting shall be cut off as flush to the ground as possible. The tree stumps will remain and shall be treated with an herbicide immediately after cutting to prevent sprouting.

The Contractor must use all precautions necessary to ensure that no trees, branches or other debris fall onto any adjacent roadway during any time during this contract. The contractor must also ensure that all existing utilities, fences, guardrails, sidewalks, curbs, and all other existing roadside structures are not damaged during any of the clearing and grubbing operations. Any damaged property shall be replaced at the Contractor's expense.

**Shrub, Brush, and Other Plant Removal, and Preparation of Ground Surface.** Prior to clearing operations for areas covered with shrubs, brush, and other plants, the Contractor must apply an herbicide treatment as specified by the Engineer as required to facilitate the clearing operations. Contractor must allow adequate curing time for the herbicide before proceeding with clearing and grubbing. Herbicide treatment will be incidental to this item number. These areas should be cleared to a depth of 1 to 2 inches below the existing grade. The contractor must stabilize all disturbed areas with seed and mulch within 24 hours of the initial disturbance.

All depressions greater than 6 inches in depth on the slope surfaces caused by the clearing and grubbing operations shall be back-filled with approved material and compacted as directed by the Engineer.

Upon the removal of trees, brush, shrubs, etc, as required for clearing and grubbing, all disturbed areas shall be stabilized with seed and mulch within 24 hours of the initial disturbance.

**Disposal.** All materials removed by the clearing and grubbing operation shall become the property of the Contractor as shall be removed from the Project or otherwise disposed of as specified in Subsection 106.09.

**Method of Measurement:**

The quantity of work will be measures on a man-hour basis.

**Basis of Payment:**

The quantity of work will be paid for on a man-hour basis. Price will constitute full compensation for any removal and disposal of all trees (regardless of size), brush, shrubs, trash and rubbish; for furnishing and compacting approved material to fill depressions as specified; for furnishing and operating all safety equipment required to ensure the safety of the workers and to ensure that no material falls onto adjacent roadways; for replacement or repair of damaged trees, shrubbery and plants that were designated to remain; for pruning as deemed necessary; for cutting, rolling back, reconnecting, and repairing the existing chain link fence to access the site; for disposal; and for all labor, equipment, tools, machinery, herbicide and incidentals required to complete the work.

Maintenance of traffic control measures, seeding and mulching shall be paid for separately.

10/10/2018

**801500 - MAINTENANCE OF TRAFFIC - ALL INCLUSIVE**

**Description:**

This item shall consist of furnishing, installing, maintaining and/or relocating the necessary temporary traffic control devices used to maintain vehicular, bicycle and pedestrian traffic, including persons with disabilities in accordance with the Americans with Disabilities Act, as amended. All work shall be performed in a manner that will provide reasonably safe passage with the least practicable obstruction to all users, including vehicular, bicycle and pedestrian traffic.

All requirements of the Delaware Manual on Uniform Traffic Control Devices (MUTCD), Part 6, herein referred to as the Delaware MUTCD. (latest edition with all revisions made up to the date of Advertisement of this project) shall apply for all temporary traffic control devices. Any, and all, control, direction, management and maintenance of traffic shall be performed in accordance with the requirements of the Delaware MUTCD, notes on the Plans, this specification, and as directed by the Engineer.

The Contractor shall be aware that the Case Diagrams and safety measures outlined in the Delaware MUTCD are for common construction situations and modifications may be warranted based on the complexity of the job. The Contractor shall submit justification for modifications to the Temporary Traffic Control Plan (TTCP) to the Engineer for approval prior to implementation.

The Department reserves the right to impose additional restrictions, as needed, for the operational movement and safety of the traveling public. The Department reserves the right to suspend the Contractor's operations until compliance with the Engineer's directive for remedial action, based on but not limited to the following reasons:

1. The Contractor's operations are not in compliance with the Delaware MUTCD, the specifications or the Plans.
2. The Contractor's operations have been deemed unsafe by the Traffic Safety Engineer or District Safety Officer.

**Materials and Construction Methods:**

The Contractor shall submit a Temporary Traffic Control Plan (TTCP) or a Letter of Intent to use the Plan recommended Delaware MUTCD Case Diagram(s) at or prior to the pre-construction meeting. The Contractor shall submit the TTCP for all Contractor and subcontractor work to be performed on the project for the Department's approval before the start of work.

When specified by a note in the Plans, the Contractor shall be required to have an American Traffic Safety Services Association (ATSSA) certified Traffic Control Supervisor on the project. The authorized designee must be assigned adequate authority, by the Contractor, to ensure compliance with the requirements of the Delaware MUTCD and provide remedial action when deemed necessary by the Traffic Safety Engineer or the District Safety Officer. The ATSSA certified Traffic Control Supervisor's sole responsibility shall be the maintenance of traffic throughout the project. This responsibility shall include, but is not limited to, the installation, operations, maintenance and service of temporary traffic control devices. Also required is the daily maintenance of a log to record maintenance of traffic activities, i.e., number and location of temporary traffic control devices; and times of installation, changes and repairs to temporary traffic control devices. The ATSSA Traffic Control Supervisor shall serve as the liaison with the Engineer concerning the Contractor's maintenance of traffic. The name, contact number and certification for the designated Traffic Control Supervisor shall be submitted at or prior to the pre-construction meeting. The cost of the ATSSA certified Traffic Control Supervisor shall be incidental to this item.

Temporary traffic control devices shall be maintained in good condition in accordance with the brochure entitled "Quality Guidelines for Temporary Traffic Control Devices", published by the American Traffic Safety Services Association (ATSSA). Any temporary traffic control devices that do not meet the quality guidelines shall be removed and replaced with acceptable devices. Failure to comply will result in work stoppage with time charges continuing to be assessed.

Any existing signs that conflict with any temporary or permanent construction signs shall be covered as needed or as directed by the Engineer. The cost for temporarily covering conflicting signs shall be incidental to this item.

Access to all transit stops located within the project limits shall be maintained unless otherwise directed by the Plans or the Engineer. Maintaining access shall include maintaining an area for the transit vehicle and also an accessible path for pedestrians to safely access the transit stop.

The Contractor shall notify the Engineer, in writing, no less than fourteen (14) calendar days prior to the start of any detour(s) and road closures. The Engineer will notify the following entities:

- Local 911 Center
- Local School Districts
- Local Post Offices
- DelDOT's Transportation Management Center (TMC)
- Town Managers
- Local Police
- DelDOT's Public Relations
- Delaware Transit Corporation (DTC)

Immediately prior to the implementation of any lane or road closures, the Engineer shall notify the DelDOT TMC at (302) 659-4600. Notifications shall also be provided when the closures are lifted. The Engineer shall notify TMC and the District Safety Officer if any lane closures cannot be removed prior to the end of the allowable work hours.

The Contractor shall notify the local 911 center if access to a fire hydrant is temporarily restricted. The Contractor shall provide written confirmation to the Engineer that the local 911 center has been notified.

If a detour is required during any part or the entire period of this Contract, an approved detour plan shall be obtained from the Department's Traffic Safety Section. All signs, barricades and other temporary traffic control devices required as part of the approved detour plan shall be installed and maintained by the Contractor on the route that is closed and on the detour route. Road closures without an approved detour plan shall not be allowed. If a road is closed without an approved detour plan, the Contractor's operations shall be stopped immediately.

The Contractor shall provide and maintain ingress and egress for each property abutting the construction area and each property located between the diversion points of any detour and the actual construction site. Construction activities which may temporarily or otherwise interfere with property access shall be coordinated in advance with the affected property owners.

The Contractor shall conduct construction operations in a manner which will minimize delays to traffic, and shall meet the following requirements:

1. If work is being performed within 200 feet in any direction of an intersection that is controlled by a traffic signal, the flagger(s) shall direct the flow of traffic in concert with the traffic signals in construction areas to avoid queuing, unless active work prohibits such action. The flagger shall direct traffic to prevent traffic from queuing through an intersection (i.e., blocking an intersection). Only a Traffic Officer may direct traffic against the operation of a traffic signal and only until the operation occurring within the intersection is completed.
2. When a lane adjacent to an open lane is closed to travel, the temporary traffic control devices shall be set 2 feet (0.61 m) into the closed lane from the edge of the open lane, unless an uncured patch exists or actual work is being performed closer to the open lane with minimum restriction to traffic.
3. Except for "buffer lanes" on high volume and/or high speed roadways, lanes shall not be closed unless construction activity requiring lane closure is taking place, or will take place within the next hour. Lanes shall be reopened immediately upon completion of the work. Moving operations will require the lane closures be shortened as the work progresses and as traffic conditions warrant to minimize the length of the closure. The Contractor shall conduct construction operations in a manner so as to minimize disruption to traffic during peak hours and periods of heavy flow. The Department reserves the right to stop or change the Contractor's operations, if in the opinion of the Engineer, such operations are unnecessary at that time or the operations are unnecessarily impeding traffic.

4. Work in the vicinity of traffic signals, shall be scheduled to minimize the time during which the signal is operated without detectors, and prior approval from the Engineer shall be required. TMC shall be notified in advance of cutting a loop detector, and be immediately notified once the loop detector has been reinstalled. The Contractor shall provide sufficient advance notice of the loop detector work with the Engineer to ensure the aforementioned requirements are met.

It is required that all temporary traffic control work and related items shall either be performed entirely by the Contractor's own organization, or totally subcontracted. Maintenance of equipment shall not be subject to this requirement.

Any deficiencies related to temporary traffic control that are reported to the Contractor in writing shall be corrected within 24 hours or as directed by the Engineer. Failure to comply will result in non-payment for those devices that are found to be deficient for the duration of the deficiency. Serious deficiencies that are not corrected immediately shall result in suspension of work until items identified are brought back into compliance.

At the end of each day's work, the Contractor shall correct all pavement edge drop-offs in accordance with Table 6G-1 in the Delaware MUTCD. This corrective work shall be accomplished with Temporary Roadway Material (TRM) unless an alternate method is specified in the Plans. All ruts and potholes shall be filled with TRM as soon as possible but no later than the end of each work day. Placement and Payment of TRM shall be completed in accordance with Section 403 of the Standard Specifications. If temporary elimination of a drop-off hazard cannot be accomplished, then the area should be properly marked and protected with temporary traffic control devices such as temporary barricades, warning signs, flashing lights, etc. as required by Section 6G.21 of the Delaware MUTCD.

All open trench excavation accessible by vehicular traffic must be backfilled prior to the end of each working day. Steel plates shall not be used except in emergency situations and only with prior written approval from the Engineer unless otherwise directed by the Plans.

The Contractor shall submit, at or prior to the preconstruction meeting, detailed drawings including but not limited to existing striping lengths, lane and shoulder widths, turn lane lengths, locations of stop bars, turn arrows, crosswalks and railroad crossings. The drawings shall depict the existing pavement markings for each project location. These drawings will be reviewed by the Department's Traffic Section to determine the need for modification(s) for compliance with the Delaware MUTCD. Temporary pavement markings, on the final pavement surface, shall match the Plan dimensions and layout or the approved drawings of the permanent markings in compliance with Section 3 of the Delaware MUTCD. All conflicting or errant striping shall be removed as directed by the Engineer in compliance with the specifications for Item 817031 - Removal of Pavement Striping.

At the end of each day's operation and before traffic is returned to unrestricted roadway use, temporary striping shall be utilized when the existing pavement is milled and hot mix will not be placed the same day or more than a single course of hot mix is to be placed or permanent roadway striping cannot be placed on the same day as the placement of the final course of hot mix. Placement of temporary striping shall receive prior approval from the Engineer and the contractor shall apply temporary pavement markings in accordance with the requirements of Section 817 of Delaware Standard specifications and the Delaware MUTCD. Payment for temporary pavement striping shall be made at the unit price bid for item 817 - Temporary Striping. Payment for final striping will be included in the applicable striping item.

The Contractor shall have temporary striping/delineating materials (such as raised markers, tape, and other approved materials) available at the job site for verification by the Department prior to starting the hot-mix paving operation on roads to be immediately opened to traffic. These materials shall be used by the Contractor for temporary markings if he/she fails to apply temporary marking paint, etc., as required by the Delaware MUTCD. No paving operations on roads to be immediately opened to traffic will be allowed unless such verification has been made for the availability of the materials at the job site.

Travel lane and ramp closings on multilane highways and Interstates shall not be permitted during the following holiday periods:

- December 24 through December 27 (Christmas Day)
- December 31 through January 3 (New Years Day)
- Friday prior to Easter through Easter Sunday
- Thursday prior to Memorial Day through the Tuesday following Memorial Day

- Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)
- July 3 through July 5 (Independence Day)
- Thursday prior to Labor Day through the Tuesday following Labor Day
- Wednesday prior to Thanksgiving Day through the Monday following Thanksgiving Day

Additional time restrictions may apply as noted in the project plans or as directed by the Engineer. Any requests to waive any restrictions must be made in writing to the Engineer for review and approval. A copy of the request shall be provided to the District Safety Officer for review.

**Certification:**

Temporary traffic control devices used on all highways open to the public in this State shall conform to the Delaware MUTCD. All devices shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, the memorandum issued August 28, 1998 by The USDOT Federal Highway Administration, and/or in accordance with the latest edition of the Manual for Assessing Safety Hardware (MASH), published by the American Association of State Highway and Transportation Officials (AASHTO).

The Contractor shall submit certification for temporary traffic control devices or vendors used specifically on this project at or prior to the pre-construction meeting. Certification of compliance with NCHRP report 350 and/or MASH is required for the following categories of temporary traffic control devices:

**Category I** contains small and lightweight channelizing and delineating control devices which includes cones, tubular markers, flexible delineator post and drums, all without any accessories or attachments.

**Category II** includes temporary traffic control devices that are not expected to produce significant vehicular velocity changes to impacting vehicles. These devices which shall weigh 100 pounds or less, include Type I, II and III barricades, portable sign supports with signs, and intrusion alarms. Also included are drums, cones, and vertical panels with accessories or attachments.

**Category III** includes temporary traffic control devices that are expected to cause significant vehicular velocity changes to impacting vehicles. These devices which weigh more than 100 pounds include temporary barrier, temporary impact attenuators, and truck-mounted attenuators.

**Category IV** includes portable or trailer-mounted devices such as arrow panels, variable message signs, temporary traffic signals and temporary area lighting.

For Category I devices, the manufacturer or Contractor may self-certify that the devices meet the NCHRP-350 and/or MASH criteria. The Contractor shall supply the Federal Highway Administration's NCHRP-350 and/or MASH acceptance letter for each type of device that falls under Category II and III devices.

**Basis of Payment:**

Payment will be made at the Lump Sum price for "Maintenance of Traffic", for which price and payment constitutes full compensation for all maintenance of traffic activities accepted by the Engineer, which shall include the cost of furnishing and relocating permanent and temporary traffic control signs, traffic cones or drums, submission of temporary traffic control plan(s), submission of existing pavement marking drawings, submission of all required certifications, labor, equipment and incidentals necessary to complete the item. Payment to furnish and maintain other temporary traffic control devices including but not limited to Portable P.C.C. Safety Barrier, Truck Mounted Attenuators, Portable Changeable Message Signs, Arrow Panels and Portable Light Assemblies will be made at the contract unit price for each item.

**NOTE**

If the Contractor does not complete the Contract work within the Contract completion time (including approved extension time), the Contractor shall be responsible for providing the necessary temporary traffic control devices that are required to complete any remaining work. The costs of such temporary traffic control shall be borne by the Contractor. No additional payment will be made to the Contractor to maintain traffic in accordance with the Delaware MUTCD, contract plans and specifications. Temporary traffic control items include, but not be limited to, warning lights, warning signs, barricades, plastic drums, P.C.C. safety barrier, flaggers, traffic officers, arrow panels, message boards, and portable impact attenuators.

**908516 - SODDING**

**Description:**

This work consists of preparing the ground area, and furnishing and placing approved sod.

**Materials:**

**Sod.** Sod shall be well rooted from high quality seed of known origin and native to the locality of the work. The Department reserves the right to visit the proposed sod source prior to the granting of a source approval. Sod shall be stripped, delivered, and laid within a period of 36 hours. Sod stripped and delivered but not laid within this period shall be reinspected and approved by the Engineer prior to use.

If Fine Fescue-Bluegrass sod is used, it shall contain the following percentages by weight in the blend:

Creeping Red Fescue ( <i>Festuca rubra</i> L. subsp. <i>Rubra</i> ) . . . . .	10%
Chewing Fescue ( <i>Festuca rubra</i> L. subsp. <i>commutata</i> Gavd.) . . . . .	20%
Hard Fescue ( <i>Festuca longifolia</i> Thuill.) . . . . .	55%
Kentucky Bluegrass ( <i>Poa pratensis</i> L.) . . . . .	15%

The varietal makeup of the Fine Fescue-Bluegrass sod must be submitted to the Engineer for approval prior to the actual cutting and lifting of the sod.

Sod shall be free of objectionable grassy and broadleaf weeds. Sod shall be considered free of such weeds if less than five such plants are found per 100 ft<sup>2</sup> of area. Sod shall not be acceptable if it contains any of the following weeds: common bermudagrass (wiregrass), quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canadian thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, or bromegrass.

Sod shall be reasonably free of thatch, diseases, nematodes, and soil-borne insects. All sod must display the official State Certification tags of the state from which the sod originated. The same shall apply to all sod shipped intra-state with prior inspection and tagging through the Delaware State Department of Agriculture.

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

**Construction Methods:**

**Cutting Sod.** Before stripping, sod shall be mowed uniformly at a height of 1" to 2½". Sod shall be machine cut at a uniform soil thickness of 5/8" ± 1/4", at the time of cutting. Measurement for thickness shall exclude top growth and thatch. The sod pad size shall be cut to a minimum uniform width of 12" and a minimum length of 12".

**Placing.** Sod shall be placed only when the soil is moist and favorable to growth. Sod shall not be placed between November 1 and April 1, unless weather and soil conditions are considered favorable and permission is granted.

**Preparation of Grade.** The area to be sodded shall be shaped and finished to the lines and grades indicated on the Plans, and the surface loosened prior to placing the sod. The Contractor shall water the slope before the sod is placed.

**Laying the Sod.** The sod shall be placed on the prepared surface with the edges in close contact. Each strip or section of sod shall be fitted and tamped into place with hand tampers of not less than 100 in<sup>2</sup> in area.

After slopes of either cuts or fills have been shaped to conform to the finished grade and cross-section shown on the Plans, the shoulders and toes of the slope shall be rounded off to a 5' radius, or as otherwise indicated in the Plans.

On all slopes, sod shall be laid with the long edges parallel to the contour starting at the bottom of the slope. Successive strips shall be neatly matched, and all joints staggered or broken. When placing sod in drainage ditches, the length of the strip shall be laid parallel to the direction of the flow of the water. Where the sod may be displaced during sodding operations, the workers, when replacing it, shall work from ladders or treated planks to prevent further displacement.

Each strip or section of sod placed on slopes 1:2 (vertical to horizontal) and steeper, and surface drainage V-shaped or flat bottom ditches or gutters, shall be staked securely with at least two stakes or pins spaced not more than 24" apart with the flat side against the slope. Stakes shall either be wood wedges or T-shaped wire pins. Wood wedges shall be ½" by 1" by 6" to ½" by 1" by 12", as required by soil conditions, and driven so that the last 1" remains above the top of the sod. T-shaped wire pins shall be machine bent from 15" pieces of 8 gage low carbon bright steel with a 8" leg, a 4" head, and a 1 secondary drive and driven flush with the top of the sod.

When sodding adjacent to a sidewalk, curb, pavement, or retaining walls, sufficient allowance shall be made in grading for the thickness of the sod, so that when placed, the sod shall be flush with the tops of such structures. The sod shall be tamped to ensure tight joints and a smooth level surface. As the top of the slope is reached, the sod shall be trimmed to a line placed at a fixed distance from the break of the bank and along the entire length of the cut or fill. The top of the bank shall have been previously graded, so that the sod, when applied, comes flush with the average level of the top of the bank. All surfaces shall be uniform in appearance and reasonably true to line and grade.

The Contractor shall water the sod immediately after placement to a depth sufficient so that the underside of the new sod pads and soil immediately below the sod are thoroughly wet. The sod shall be kept moist until growth is established. All sod in which shrinking, burning, or turning brown occurs shall be rejected, removed, and replaced.

A satisfactory stand of grass from sod, as determined by the Engineer, shall be required. To be acceptable, a stand of grass from sod must display an even flush of growth and show evidence of soil surface contact, minimal undermining, and minimal erosion.

**Method of Measurement:**

The quantity of sodding will be measured in square yards along the surface of the area of sod placed and accepted.

**Basis of Payment:**

The quantity of sodding will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for furnishing all materials, including sod; for grading, rounding the shoulders and toes of slopes, hauling, laying, and tamping; for all watering until final acceptance; and for all labor, equipment, tools, and incidentals required to complete the work.

10/10/2018

# **BID PROPOSAL FORMS**

**CONTRACT T201903201.01**

UNLESS OTHERWISE DIRECTED, SUBMIT ALL FOLLOWING PAGES TO:

DEPARTMENT OF TRANSPORTATION  
BIDDERS ROOM (B1.11.01)  
800 BAY ROAD  
DOVER, DELAWARE 19901

Identify the following on the outside of the sealed envelope:

- Contract Number T201903201.01
- Name of Contractor

CONTRACT ID: T201903201.01

PROJECT(S): T201903201

All figures must be typewritten.

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 Category 0001

0010	202000 EXCAVATION AND EMBANKMENT	500.000 CY				
0020	202004 UNDERCUT EXCAVATION, PATCHING	50.000 CY				
0030	209005 FURNISHING BORROW, TYPE C FOR PIPE AND UTILITY TRENCH BACKFILL	600.000 CY				
0040	211001 REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT, CURB AND SIDEWALK	4000.000 SY				
0050	211500 TREE REMOVAL, 6" TO 15" DIAMETER	40.000 EACH				
0060	211501 TREE REMOVAL, GREATER THAN 15" TO 25" DIAMETER	40.000 EACH				
0070	211502 TREE REMOVAL, GREATER THAN 25" TO 37" DIAMETER	40.000 EACH				
0080	211503 TREE REMOVAL, GREATER THAN 37" TO 49" DIAMETER	12.000 EACH				
0090	211509 TREE TRIMMING	30.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0100	211510 STUMP REMOVAL	300.000 LF				
0110	211511 ROOT PRUNING	948.000 LF				
0120	301001 GRADED AGGREGATE BASE COURSE, TYPE B	110.000 CY				
0130	301002 GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	150.000 CY				
0140	301003 GRADED AGGREGATE BASE COURSE, TYPE B	250.000 TON				
0150	302005 DELAWARE NO. 57 STONE	100.000 TON				
0160	401005 SUPERPAVE TYPE C, PG 64-22 (CARBONATE STONE)	5000.000 TON				
0170	401014 SUPERPAVE TYPE B, PG 64-22	550.000 TON				
0180	401029 SUPERPAVE TYPE C, PG 64-22, PATCHING	1100.000 TON				
0190	401030 SUPERPAVE TYPE B, PG 64-22, PATCHING	250.000 TON				
0200	401500 FOG SEAL	12500.000 GAL				

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			DOLLARS	CTS	DOLLARS	CTS
0210	401506 SPEED HUMP	180.000 LF				
0220	401574 PERVIOUS BITUMINOUS ASPHALT PAVEMENT	250.000 TON				
0230	401756 RUBBER MODIFIED FOG SEAL	11500.000 GAL				
0240	401758 COAL SLAG	10750.000 LB				
0250	401760 FOG SEAL WITH CURBING	11800.000 GAL				
0260	401761 RUBBER MODIFIED FOG SEAL WITH CURBING	11000.000 GAL				
0270	402000 BITUMINOUS CONCRETE PATCHING	7000.000 SYIN				
0280	504001 CRACK AND JOINT SEALING LESS THAN 3/4 INCH WIDE	11600.000 LF				
0290	504002 CRACK AND JOINT SEALING, 3/4 INCH TO 1 3/4 INCH WIDE	5800.000 LF				
0300	601000 CLEANING DRAINAGE PIPE, 15"-24" DIAMETER	575.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
0310	601001 CLEANING DRAINAGE PIPE, GREATER THAN 24" DIAMETER	490.000 LF				
0320	601011 REINFORCED CONCRETE PIPE, 15", CLASS III	470.000 LF				
0330	601012 REINFORCED CONCRETE PIPE, 18", CLASS III	275.000 LF				
0340	601016 REINFORCED CONCRETE PIPE, 30", CLASS III	270.000 LF				
0350	601103 REINFORCED CONCRETE ELLIPTICAL PIPE, 24"X 38", CLASS III	150.000 LF				
0360	601141 REINFORCED CONCRETE FLARED END SECTION, 15"	6.000 EACH				
0370	601142 REINFORCED CONCRETE FLARED END SECTION, 18"	4.000 EACH				
0380	601146 REINFORCED CONCRETE FLARED END SECTION, 30"	4.000 EACH				
0390	601191 PVC PIPE, 6"	104.000 LF				
0400	601219 CORRUGATED POLYETHYLENE PIPE, TYPE S, 12"	296.000 LF				

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			DOLLARS	CTS	DOLLARS	CTS
0410	601220 CORRUGATED POLYETHYLENE PIPE, TYPE S, 15"	120.000 LF				
0420	601261 GALVANIZED CORRUGATED STEEL PIPE, 15", 16GAGE, 2-2/3" X 1/2" CORRUGATION	88.000 LF				
0430	601264 GALVANIZED CORRUGATED STEEL PIPE, 24", 16 GAGE, 2-2/3" X 1/2" CORRUGATION	104.000 LF				
0440	601504 PERSONAL GRATE FOR PIPE INLET	LUMP		LUMP		
0450	602002 DRAINAGE INLET, 34" X 18"	6.000 EACH				
0460	602003 DRAINAGE INLET, 34" X 24"	6.000 EACH				
0470	602005 DRAINAGE INLET, 48" X 48"	8.000 EACH				
0480	602011 DRAINAGE INLET, 72" X 72"	6.000 EACH				
0490	602033 MANHOLE, 66" X 48"	4.000 EACH				
0500	602100 REPLACE DRAINAGE INLET GRATE(S)	11.000 EACH				

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			DOLLARS	CTS	DOLLARS	CTS
0510	602101 REPLACE DRAINAGE INLET FRAME (S)	11.000 EACH				
0520	602130 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	6.000 EACH				
0530	602132 ADJUSTING AND REPAIRING EXISTING MANHOLE	6.000 EACH				
0540	610015 PORTLAND CEMENT CONCRETE MASONRY, CLASS C	500.000 CY				
0550	701012 PORTLAND CEMENT CONCRETE CURB, TYPE 1-6	400.000 LF				
0560	701018 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 1-8	400.000 LF				
0570	701019 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 2	600.000 LF				
0580	701023 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-8	400.000 LF				
0590	705001 PORTLAND CEMENT CONCRETE SIDEWALK, 4"	6300.000 SF				
0600	705002 PORTLAND CEMENT CONCRETE SIDEWALK, 6"	1150.000 SF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0610	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF 380.000				
0620	705008 CURB RAMP, TYPE 1	SF 800.000				
0630	705009 CURB RAMP, TYPE 2, 3, AND/OR 4	SF 750.000				
0640	705010 CURB RAMP, TYPE 5	SF 580.000				
0650	707001 RIPRAP, R-4	SY 300.000				
0660	707002 RIPRAP, R-5	SY 70.000				
0670	707020 PRESACKED CONCRETE RIPRAP	CY 210.000				
0680	708003 GEOTEXTILES, RIPRAP	SY 375.000				
0690	710002 ADJUST WATER VALVE BOXES	EACH 32.000				
0700	760010 PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT	SYIN 4300.000				

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			DOLLARS	CTS	DOLLARS	CTS
0710	760011 PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT, TAPER CUT	5700.000 SYIN				
0720	760013 PAVEMENT MILLING, PORTLAND CEMENT CONCRETE PAVEMENT	2300.000 SYIN				
0730	760503 PAVEMENT MILLING, PATCHING	800.000 SYIN				
0740	762000 SAW CUTTING, BITUMINOUS CONCRETE	1200.000 LF				
0750	762001 SAW CUTTING, CONCRETE, FULL DEPTH	200.000 LF				
0760	762002 SAW CUTTING, CONCRETE, VARIABLE DEPTH	610.000 LF				
0770	762004 BUTT JOINTS	2900.000 SY				
0780	763000 INITIAL EXPENSE/DE-MOBILIZATION	LUMP	LUMP			
0790	763587 MAN HOUR OF MISCELLANEOUS WORK	600.000 HOUR				
0800	801500 MAINTENANCE OF TRAFFIC, ALL INCLUSIVE	LUMP	LUMP			

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			DOLLARS	CTS	DOLLARS	CTS
0810	802003 ARROW PANELS TYPE C	43.000 EADY				
0820	803001 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	43.000 EADY				
0830	804001 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY (FLOOD LIGHTS)	25.000 EADY				
0840	805001 PLASTIC DRUMS	747.000 EADY				
0850	806001 TRAFFIC OFFICERS	100.000 HOUR	75.00000		7500.00	
0860	808002 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	50.000 EADY				
0870	811002 FLAGGER, KENT COUNTY, STATE	1600.000 HOUR				
0880	811014 FLAGGER, KENT COUNTY, STATE, OVERTIME	300.000 HOUR				
0890	813001 TEMPORARY BARRICADES, TYPE III	150.000 LFDY				
0900	817002 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, ALKYD-THERMOPLASTIC	500.000 SF				

CONTRACT ID: T201903201.01

PROJECT(S): T201903201

All figures must be typewritten.

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0910	817003 TEMPORARY MARKINGS, PAINT, 4"	1650.000 LF				
0920	817004 TEMPORARY MARKINGS, PAINT, SYMBOL/LEGEND	695.000 SF				
0930	817026 PAINTING OF WHITE OR YELLOW, 5" LINE	1801.000 LF				
0940	908001 TOPSOIL	359.000 TON				
0950	908003 TOPSOIL, 4" DEPTH	3500.000 SY				
0960	908005 TOPSOIL, 12" DEPTH	250.000 SY				
0970	908014 PERMANENT GRASS SEEDING, DRY GROUND	702.000 SY				
0980	908016 PERMANENT GRASS SEEDING, SUBDIVISION	2680.000 SY				
0990	908516 SODDING	4000.000 SY				
1000	911000 PLANTINGS	LUMP		LUMP		
	SECTION 0001 TOTAL					
	TOTAL BID					

# **BREAKOUT SHEET INSTRUCTIONS**

**BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.**

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: [DOT-ASK@STATE.DE.US](mailto:DOT-ASK@STATE.DE.US)  
SUBJECT: **T201903201.01** Breakout Sheet

OR MAILED TO: DELDOT  
CONTRACT ADMINISTRATION  
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER  
MUST APPEAR ON THE ENVELOPE.

**BREAKOUT SHEET - I****CONTRACT NO. T201903201.01****Item 801500 - MAINTENANCE OF TRAFFIC, ALL INCLUSIVE**

LOCATION NO.	LOCATION DESCRIPTION	WORKING HOURS	PRIMARY MOT CASE SET-UPS	UOM	UNIT PRICE	AMOUNT
1	10 open-end locations in Kent county	Time restrictions for open-end locations are determined by the District Safety Officer and Engineer.	TA-3	LS	\$	\$
1	30 open-end locations in Kent county	Time restrictions for open-end locations are determined by the District Safety Officer and Engineer.	TA-10	LS	\$	\$
1	30 open-end locations in Kent county	Time restrictions for open-end locations are determined by the District Safety Officer and Engineer.	TA-28	LS	\$	\$
1	20 open-end locations in Kent county	Time restrictions for open-end locations are determined by the District Safety Officer and Engineer.	TA-29	LS	\$	\$
1	5 open-end locations in Kent county	Time restrictions for open-end locations are determined by the District Safety Officer and Engineer.	TA-33	LS	\$	\$
1	5 open-end locations in Kent county	Time restrictions for open-end locations are determined by the District Safety Officer and Engineer.	TA-36	LS	\$	\$
<b>TOTAL ITEM 801500 - MAINTENANCE OF TRAFFIC, ALL INCLUSIVE \$</b> <b>(LUMP SUM BID PRICE FOR ITEM 801500 - MAINTENANCE OF TRAFFIC, ALL INCLUSIVE)</b>						

**BREAKOUT SHEET - 2**  
**Item 601504 - PERSONAL GRATE FOR PIPE INLET**

**CONTRACT NO. T20190320.01**

LOCATION NO.	LOCATION DESCRIPTION	QUANTITY	UOM	UNIT PRICE	AMOUNT
1	15"	4	LS	\$	\$
1	18"	4	LS	\$	\$
1	30"	4	LS	\$	\$
1	24"X38"	4	LS	\$	\$

**TOTAL ITEM 601504 - PERSONAL GRATE FOR PIPE INLET \$**  
**(LUMP SUM BID PRICE FOR ITEM 601504 - PERSONAL GRATE FOR PIPE INLET)**

**BIDDING**

# "ATTENTION"

# TO BIDDERS

**BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.**

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: [DOT-ASK@STATE.DE.US](mailto:DOT-ASK@STATE.DE.US)  
SUBJECT: **T201903201.01** 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)

**CERTIFICATION**  
Contract No. T201903201.01

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.

The foregoing quantities are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any such increase or decrease in the quantity for any item will not be regarded as a sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided in the contract.

Accompanying this proposal is a surety bond or a security of the bidder assigned to the Department of Transportation, for at least ten (10) percentum of total amount of the proposal, which deposit is to be forfeited as liquidated damages in case this proposal is accepted, and the undersigned shall fail to execute a contract with necessary bond, when required, for the performance of said contract with the Department of Transportation, under the conditions of this proposal, within twenty (20) days after date of official notice of the award of the contract as provided in the requirement and specifications hereto attached; otherwise said deposit is to be returned to the undersigned.

I/We are licensed, or have initiated the license application as required by Section 2502, Chapter 25, Title 30, of the Delaware Code.

By submission of this proposal, each bidder and each person signing on behalf of any 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								
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

**BIDDERS MUST ACKNOWLEDGE RECEIPT OF ALL ADDENDA**

**MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE:** \_\_\_\_\_



**AFFIRMATION:**

Within the past five (5) years, has your firm, any affiliate, any predecessor company or entity, owner, Director, officer, partner or proprietor been the subject of a Federal, State, Local government suspension or debarment?

YES \_\_\_\_\_ NO \_\_\_\_\_ if yes, please explain \_\_\_\_\_

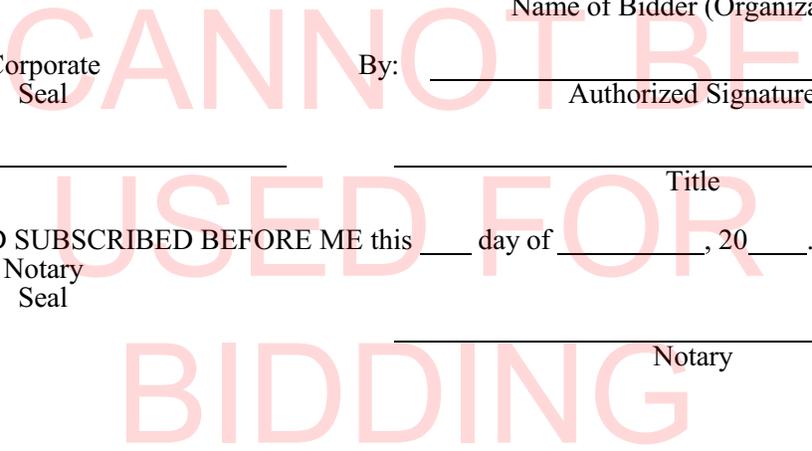
-----  
Sealed and dated this \_\_\_\_\_ day of \_\_\_\_\_ in the year of our Lord two thousand \_\_\_\_\_ (20\_\_\_\_).

\_\_\_\_\_  
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 bound unto the **State** in the sum of \_\_\_\_\_  
Dollars (\$ \_\_\_\_\_), or \_\_\_\_\_ percent not to exceed \_\_\_\_\_

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_) of amount of bid on  
Contract No. T201903201.01, to be paid to the **State** for the use and benefit of its Department of  
Transportation ("**DelDOT**") for which payment well and truly to be made, we do bind ourselves, our and  
each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole  
firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal**  
who has submitted to the **DelDOT** a certain proposal to enter into this contract for the furnishing of  
certain materiel and/or services within the **State**, shall be awarded this Contract, and if said **Principal**  
shall well and truly enter into and execute this Contract as may be required by the terms of this Contract  
and approved by the **DelDOT**, this Contract to be entered into within twenty days after the date of official  
notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be  
void or else to be and remain in full force and virtue.

Sealed with \_\_\_\_\_ seal and dated this \_\_\_\_\_ day of \_\_\_\_\_ in the year of our Lord  
two thousand and \_\_\_\_\_ (20\_\_\_\_).

SEALED, AND DELIVERED IN THE  
presence of

\_\_\_\_\_  
Name of Bidder (Organization)

Corporate  
Seal

By: \_\_\_\_\_  
Authorized Signature

Attest \_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Surety

Witness: \_\_\_\_\_

By: \_\_\_\_\_  
\_\_\_\_\_  
Title