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 T201509002.01

FEDERAL AID PROJECT NO. ENHS-2015(27)

I-95/I-295/I-495 Interstate High Mast Lighting Improvements

New Castle County

ADVERTISEMENT DATE: April 25, 2016

COMPLETION TIME: 124 Calendar Days

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

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time **May 24, 2016**

Contract No.T201509002.01
Federal Aid Project No. ENHS-2015(27)

I-95/I-295/I-495 Interstate High Mast Lighting Improvements
New Castle County

GENERAL DESCRIPTION

LOCATION

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

DESCRIPTION

The improvements consist of furnishing all labor and materials for the upgrading of the lighting at the I-95/I-295/I-495 Interchange. We will be upgrading the power supply, upgrading the luminaries to led, installing 120 foot light poles, and running new wire in order to create a safe and sufficient manner to travel the interstate highways 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 124 Calendar Days. The Contract Time includes an allowance for 13 Weather Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about August 5, 2016.

PROSPECTIVE BIDDERS NOTES:

1. BIDDERS MUST BE REGISTERED with DelDOT and request a cd of the official plans and specifications in order to submit a bid. Contact DelDOT at dot-ask@state.de.us, or (302) 760-2031.
2. QUESTIONS regarding this project are to be e-mailed to dot-ask@state.de.us no less than six business days prior to the bid opening date in order to receive a response. Please include T201509002.01 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
   Please note a few of the requirements listed below;

   * At bid submission - submit with the bid a signed affidavit certifying that the Contractor has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for their Employees that complies with this regulation;
   * Upon DBE participation submission - submit a separate signed affidavit from each DBE Subcontractor certifying they have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for their Employees that complies with this regulation;
   * 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 each participating DBE firm;
   * 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;
   * Testing Report Forms shall be submitted to DelDOT monthly (forms will be provided).
   * Penalties for non-compliance are specified in the regulation.

6. Supplemental Specifications to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be viewed here. The ***Specifications Note*** document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.
7. **PLEASE NOTE** federal requirements for the DBE program under 49CFR §26.53(b)(3)(i)(B) have changed effective November 3, 2014. Submission of DBE participation information is now required from the lowest apparent bidder no later than seven (7) days after bid opening *(formerly 10 days)*.
8. No RETAINAGE will be withheld on this contract.
9. The Department's External Complaint Procedure can be viewed on DelDOT's Website at; http://www.deldot.gov/information/business/, or you may request a copy by calling (302) 760-2555.

CONSTRUCTION ITEMS UNITS OF MEASURE

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

*Not used for units of measurement for payment.

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GENERAL NOTICES

SPECIFICATIONS:

The specifications entitled "Delaware Standard Specifications for Road and Bridge Construction, August, 2001", hereinafter referred to as the Standard Specifications; Supplemental Standard Specifications; the Special Provisions; notes on the Plans; this Bid Proposal; and any addenda thereto, shall govern the work to be performed under this contract.

CLARIFICATIONS:

Under any Section or Item included in the Contract, the Contractor shall be aware that when requirements, responsibilities, and furnishing of materials are outlined in the details and notes on the Plans and in the paragraphs preceding the " Basis of Payment" paragraph in the Standard Specifications or Special Provisions, no interpretation shall be made that such stipulations are excluded because reiteration is not made in the "Basis of Payment" paragraph.

ATTESTING TO NON-COLLUSION:

The Department requires as a condition precedent to acceptance of bids a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract. The form for this sworn statement is included in the proposal and must be properly executed in order to have the bid considered.

QUANTITIES:

The quantities shown are for comparison of bids only. The Department may increase or decrease any quantity or quantities without penalty or change in the bid price.

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

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

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

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

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

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

TAX CLEARANCE:

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

LICENSE:

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

SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

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

DIFFERING SITE CONDITIONS,

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

Differing site conditions: During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract of 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 fourth the reasons and support for such adjustment.

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

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

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

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

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

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

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

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

CONFLICT WITH FEDERAL STATUTES OR REGULATIONS:

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

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

FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS

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

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

CONVICT PRODUCED MATERIALS:

(a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) Qualified prison facility means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

TO REPORT BID RIGGING ACTIVITIES:

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

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

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

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

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for Minority Participation In Each Trade	Goals for Female Participation In Each Trade
12.3% (New Castle County) 14.5% (Kent & Sussex Counties)	6.9% (Entire State)

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

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

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

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is New Castle County.

REV. 11-3-80

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

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
   d. "Minority" includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Program Office or from the Federal procurement contracting offices. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

   a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
   b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
   c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
   d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
   e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
   f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
   g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
   h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
   i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
   j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
   k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participating, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Order of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate

of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

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

* * * * *

TRAINING SPECIAL PROVISIONS

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

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

The number of trainees to be trained under the special provision will be 0. In the event the contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year apprenticeship or training.

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

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

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

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Department of Highways and Transportation and the Federal Highway Administration. The Department of Highways and Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment

obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work the classification covered by the program. It is the intention of these provisions that the training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some off-site training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

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

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

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

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

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

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

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INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT & TRANSPORTATION EQUITY ACT

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

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION

The U.S. Department of Transportation (DOT) requires that the Delaware Department of Transportation continue the established Disadvantaged Business Enterprise (DBE) Program for participation in U.S. DOT programs and that the program follow the final rules as stated in 49 CFR Part 26 and the Department's approved DBE Program plan.

The following definitions apply to this subpart:

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

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

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

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

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

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

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

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

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

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

Disadvantaged Business Enterprise 15 % Percent

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

Bidders are required to submit with their bids the completed DBE Program Assurance portion of the Certification document which will state the bidders intent of meeting the goals established for this contract; or in the instance where a contractor cannot meet the assigned DBE Goals for this contract, he/she shall at the time of bid submit documentation required to verify that he/she has made a Good Faith Effort to meet the DBE Goals. Guidance for submitting a Good Faith Effort is identified in the next section and in the DBE Program Plan. Further, the apparent low bidder must submit to DelDOT within seven (7) calendar days after

the bid opening, executed originals of each and every DBE subcontract to satisfy contract goals consistent with the DBE Program Assurance submitted as part of the bid package.

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

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

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

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CRITICAL DBE REQUIREMENTS

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

1. In the event that the bidder cannot meet the DBE goal as set forth in this specification, he/she shall at the time of bid submit to the Department that percentage of the DBE Goal that will be met, if any, on the written and notarized assurance made a part of this contract. The contractor shall also at the time of bid submit all documentation that the contractor wishes to have the Department consider in determining that the contractor made a Good Faith Effort to meet contract DBE Goals. The Department will not accept Good Faith Effort documentation other than on the scheduled date and time of the bid opening. However, the Department may ask for clarification of information submitted should the need arise.
2. A bid which does not contain either a completely executed DBE Program Assurance and/or Good Faith Effort documentation, where appropriate, shall be declared non-responsive and shall not be considered by the Department.
3. Failure of the apparent low bidder to present originals of all DBE subcontracts to substantiate the volume of work to be performed by DBE's as indicated in the bid within seven (7) calendar days after the bid opening shall create a rebuttable presumption that the bid is not responsive.
4. Bidders are advised that failure to meet DBE Goals during the term of the contract may subject them to Department sanctions as identified in the DBE Program Plan.
5. In the execution of this contract, the successful bidder agrees to comply with the following contract clauses:

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

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

"The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such remedy as the recipient deems appropriate." 49 CFR Section 26.13

7. In addition to this specification, bidders must comply with all provisions of the rules and regulations adopted by the U.S. Department of Transportation for DBE participation in U.S. DOT and DelDOT Programs (49 CFR Part 26) and the Delaware Department of Transportation Disadvantaged Business Enterprise Program Plan; each of which is hereby incorporated and made part of this specification. Bidders are also reminded that they must be responsible and responsive bidders in all other aspects aside from the DBE Program in order to be awarded the contract.
8. In accordance with 49 CFR 26.53(f)(1), DelDOT requires that a prime contractor not terminate a DBE subcontractor without prior written consent from the DelDOT Civil Rights Office. This includes, but is not limited to, instances in which a prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

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GUIDANCE FOR GOOD FAITH EFFORT

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

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

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

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

1. Failure to contract with a DBE solely because the DBE was unable to provide performance and/or payment bonds.
2. Rejection of a DBE bid or quotation based on price alone.

3. Rejection of a DBE because of its union or non-union status.
4. Failure to contract with a DBE because the contractor normally would perform all or most of the work in the contract.

Administrative reconsideration:

Within five (5) days of being informed by DelDOT that it is not responsive because it has not documented sufficient good faith efforts, a bidder may request administrative reconsideration. Bidder should make this request in writing to the following reconsideration official: Director of Administration, DelDOT, P. O. Box 778, Dover, Delaware 19903. The reconsideration official will not have played any role in the original determination that the bidder did not document sufficient good faith efforts.

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

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

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

I. GENERAL

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

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

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

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

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

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

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as

amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

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

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

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

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

    a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

    b. The contractor will accept as its operating policy the following statement:
    "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

    a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

    b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

    c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

   a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

   b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

   c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

   a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
   b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

   c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

   d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

   a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

   b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

   a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

   b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

   d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

   a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

   b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

    a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

    b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

    a. The records kept by the contractor shall document the following:

        (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

        (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

        (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

    b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

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

1. Minimum wages

    a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

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

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

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

2. Withholding

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

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without

rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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

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

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program,

the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

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

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

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

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

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

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

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

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

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in

accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

    a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

    b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

    c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

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

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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

original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

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

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

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

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

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

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

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

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

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

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

VII. SAFETY: ACCIDENT PREVENTION

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

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

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are

unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

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

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

   c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

   d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

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

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

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

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

   i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and

information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

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

* * * * *

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

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

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

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

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

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

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

2. Instructions for Certification - Lower Tier Participants:

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

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

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

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

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

"Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

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

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

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

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

* * * * *

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

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

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

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

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

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

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

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

* * * * *

CARGO PREFERENCE ACT (NEW)

Requirements in the Federal-aid Highway Program

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

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

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

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

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

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

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

NOTE:

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

* * * * *

BUY AMERICA (NEW)
Requirements in the Federal-aid Highway Program

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

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

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

* * * * *

APPENDICES TO THE TITLE VI ASSURANCE

APPENDIX A

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

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

APPENDIX E

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

Pertinent Non-Discrimination Authorities:

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

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

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

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

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

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

The Civil Rights Restoration Act of 1987,(PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of l964,The AgeDiscrimination Act of 1975and Section 504 of the Rehabilitation Act of l973,by expanding the defrnition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

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

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

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

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

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

* * * * *

PREVAILING WAGES

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

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

> (b) Every contract based upon these specifications shall contain a stipulation that the employer shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics. The specifications shall further stipulate that the scale of wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work, and that there may be withheld from the employer so much of accrued payments as may be considered necessary by the Department of Labor to pay to laborers and mechanics employed by the employer the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and rates of wages received by such laborers and mechanics to be remitted to the Department of Labor for distribution upon resolution of any claims.
>
> (c) Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

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

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

PREVAILING WAGE REQUIREMENTS

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

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

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

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

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

PREVAILING WAGES FOR **HEAVY CONSTRUCTION** EFFECTIVE MARCH 15, 2016

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	21.82	19.20	41.74
BOILERMAKERS	75.62	31.72	58.19
BRICKLAYERS	46.43	22.91	24.60
CARPENTERS	52.81	52.81	41.97
CEMENT FINISHERS	43.05	24.05	17.91
ELECTRICAL LINE WORKERS	72.73	27.89	63.84
ELECTRICIANS	65.10	65.10	65.10
GLAZIERS	20.17	17.51	11.85
INSULATORS	54.38	54.38	54.38
IRON WORKERS	60.19	60.19	57.58
LABORERS	43.60	43.60	43.60
MILLWRIGHTS	66.83	66.83	53.40
PAINTERS	75.26	75.26	75.26
PILEDRIVERS	72.97	38.86	30.25
PLASTERERS	18.99	16.49	11.15
PLUMBERS/PIPEFITTERS/STEAMFITTERS	82.03	76.87	17.67
POWER EQUIPMENT OPERATORS	61.36	61.36	61.36
SHEET METAL WORKERS	30.35	18.82	17.68
SPRINKLER FITTERS	32.70	12.38	10.25
TRUCK DRIVERS	31.56	20.36	21.99

CERTIFIED: 4/12/16 BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

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

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

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

PROJECT: T201509002.01 I 95,I 295,I 495 Interstate High Mast Lighting Improvements Fed Aid ENHS-2015 (27), New Castle County

GENERAL DECISION: DE160009 02/19/2016 DE9

Superseded General Decision Number: DE20150009

State: DELAWARE

Construction Type: HEAVY

County: New Castle County in Delaware

Note: Under Executive Order (EO) 13658 establishes an hourly minimum wage of $10.15 for calendar year 2016 applies to all contracts subject to the Davis-Bacon Act for which the solicitation was issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.15 (or the applicable wage rates listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/08/2016
1	01/22/2016
2	02/19/2016

BRDE0001-003 05/01/2015

	Rates	Fringes
Bricklayer	29.88	20.01

CARP0454-005 05/01/2014

	Rates	Fringes
Piledriverman	40.55	30.52

FOOTNOTE: PAID HOLIDAYS: Washington's Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day (provided the employee works the day before the holiday and the day after the holiday).

CARP0626-002 05/01/2015

	Rates	Fringes
Carpenter:		
Carpenter	30.87	21.69
Scaffold Building	31.62	21.69

CARP1906-007 05/01/2014

	Rates	Fringes
Millwright	34.95	30.13

ELEC0313-001 06/01/2015

	Rates	Fringes
Electrician	36.66	28.04

ENGI0542-006 05/01/2015

	Rates	Fringes
Operating Engineers:		
Bulldozer and Forklift	37.07	24.29+A

FOOTNOTE A: PAID HOLIDAY: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, and Election Day provided the employee works the scheduled work day before and after the holiday.

IRON0451-002 07/01/2015

	Rates	Fringes
Ironworkers:		
Ornamental, Reinforcing, Rigger and Structural	33.60	27.40

The following holidays shall be observed, and when work is performed thereon it shall be paid for at twice the base wage rate: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

LABO0199-004 05/01/2014

	Rates	Fringes
LABORERS		
Brick Mason Tender	23.75	16.95
Common or General	23.50	16.95

PAIN0021-027 02/01/2015

	Rates	Fringes
PAINTER, BRIDGE	43.63	18.19

SUDE2007-005 08/16/2007

	Rates	Fringes
Cement Mason/Concrete Finisher	22.92	2.88
Laborer: Pipelayer	17.43	4.51
OPERATOR: Backhoe	24.58	9.87
OPERATOR: Crane	23.83	12.13
OPERATOR: Excavator	24.99	3.85
OPERATOR: Loader	21.83	7.30
OPERATOR: Roller	18.94	3.25
Truck Driver: Dump Truck	16.11	1.68

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

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

END OF GENERAL DECISION

APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS

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

* * * * *

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

GUIDELINES

HIGHWAY CONSTRUCTION

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

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

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

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

SUPPLEMENTAL SPECIFICATIONS
TO THE
AUGUST 2001
STANDARD SPECIFICATIONS

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

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

To access the Website;
- in your internet browser, enter; http://www.deldot.gov
- on the left side of the page under 'INFORMATION', Click; 'Publications'
- scroll down under 'MANUALS' and Click; "Standard Specifications 2001"

The full Website Link is;
http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml

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

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

SPECIAL PROVISIONS

CONSTRUCTION ITEM NUMBERS

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

Standard Item Number:

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

Special Provisions Item Number:

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

Examples

Standard Item Number - 202000 Excavation and Embankment

202 Indicates Section Number

000 Indicates Sequential Number

Special Provision Item Number - 202500 Grading and Reshaping Roadway

202 Indicates Section Number

500 Indicates Sequential Number

NOTE:

PLEASE NOTE revised Supplemental Specifications to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be viewed here and at www.deldot.gov.

SPECIFICATIONS: The Department is currently updating the August 2001 Specifications for Road and Bridge Construction. Through this update, some Divisions were renumbered and some new ones were created and added. The ***Specifications Note*** document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.

401502 - ASPHALT CEMENT COST ADJUSTMENT

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

The Delaware Posted Asphalt Cement Price will be issued monthly by the Department and will be the industry posted price for Asphalt Cement, F.O.B. Philadelphia, Pennsylvania. The link for the posting is http://www.deldot.gov/information/business/bids/asphalt_cement_english.shtml.

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

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

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

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

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

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

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

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

NOTE:

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

5/05/15

202573 - TEST HOLES

Description:

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

Construction Methods:

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

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

Clear the test hole area of surface debris.

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

Excavate the test hole by the method(s) acceptable to DelDOT and noted above. The nominal diameter of the test hole shall not exceed 15 inches (375 mm) unless otherwise approved. Where facilities are discovered or located, expose the facility / utility only to the extent required for identification and data collection purposes.

Avoid damage to lines, wrappings, coatings, cathodic protection or other protective coverings and features. Hand-dig as needed to supplement mechanical excavation and to ensure safety.

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

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

Replace bedding material around exposed utility lines in accordance with owner's specifications or as otherwise directed or approved. Backfill and compact the excavation in lifts no greater than six inches using excavated material with appropriate moisture/density control. If test holes are excavated within paved areas that will be exposed to traffic, provide pavement restoration within the limits of the original cut using materials, compaction, and pavement thickness matching the excavated pavement material and thicknesses.

Method of Measurement:

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

Basis of Payment:

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

3/26/13

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description

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

.02 Bituminous Concrete Production – Quality Acceptance

(a) Material Production - Tests and Evaluations.

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

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

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

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

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

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

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

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

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

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

Table 2 - Material Parameter Weight Factors

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

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

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

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

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

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

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

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

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

Table 3 – Quality Level Analysis by the Standard Deviation Method

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

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

Table 3 – Quality Level Analysis by the Standard Deviation Method

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

Table 4 - PWL Pay Adjustment Factors

PWL	Pay Adjustment Factor (%) Column B	Pay Adjustment Factor (%) Column C
100	+5	0
99	+4	-1
98	+3	-2
97	+2	-3
96	+1	-4
95	0	-5

94	-1	-6
93	-2	-7
92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

(b) Pavement Construction - Pay Adjustments.

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

- Degree of compaction of the in-place material

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

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

Table 5: Compaction Price Adjustment Highway Locations		
Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3
93.0	92.75 – 93.25	5

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

* or remove and replace it at Engineer's discretion

Table 5A: Compaction Price Adjustment Other[1] Locations		
Degree of Compaction	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1
88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5
87.5	87.26 – 87.74	-10

87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30
85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
=< 84.0	=<84.25	-100*

* or remove and replace at Engineer's discretion

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

.04 Dispute Resolution.

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

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

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

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

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

If there is a discrepancy between the Engineer's acceptance test result and the Contractor's test result, the Contractor may ask for the Dispute Resolution sample to be tested. The Contractor may request up to two dispute resolution samples be tested per calendar year without charge. Any additional Dispute Resolution samples run at the Contractors request where the results substantiate the acceptance test result will be assessed a fee of $125. Any additional Dispute Resolution samples that substantiate the Contractors test result will not be assessed the fee. When disputes over compaction core test results occur, the Engineer's acceptance core will be used for the dispute resolution sample. The Contractor will be advised on when the testing will occur as referenced above to witness the testing. The results of the dispute resolution testing shall replace all of the applicable disputed test results for payment purposes.

Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement

Description.

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

Materials and Equipment.

The following material shall be available to complete this work:

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

The following equipment shall be available to complete this work:

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

Construction Method.

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

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

Performance Requirements.

The Engineer will judge the patch on the following basis:

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

Basis of Payment.

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

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

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

1. Contact Materials & Research (M&R) personnel to determine if information about the area is already available. If M&R has already obtained cores in the location that is being investigated, the contractor may opt to use the laboratory information for the investigation and not core the area on their own.

2. If M&R does not have information concerning the section of the roadway, the contractor needs to contact M&R to arrange for verification of coring operations. Arrangements shall be made to allow for an individual from M&R to be on the site when the cores are obtained. Cores will be turned over to M&R for evaluation.

3. The Contractor is responsible for providing all traffic control and repairing core holes in accordance to 401699 Appendix A - Repairing Core Holes in Bituminous Asphalt Pavements.

4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.

5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.

6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.

7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

Structural Number Calculations

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

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

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

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

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

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

Example:

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

Calculation:

For the Type B lift the calculation would be:

Existing HMA	2 * 0.32 = 0.64
GABC	7 * 0.14 = 0.98
	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
	2.52

11/3/14

401800 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22 (CARBONATE STONE)
401801 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22 (CARBONATE STONE)
401804 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22 (CARBONATE STONE)
401807 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22 (CARBONATE STONE)

401809 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 64-22
401810 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22
401813 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 70-22
401816 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 76-22

401818 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 115 GYRATIONS, PG 64-22
401819 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22
401821 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING
401822 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING
401823 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22, PATCHING
401824 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG-64-22, WEDGE
401825 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG-64-22, WEDGE

401827 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401830 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401833 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)

401835 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22
401836 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22
401838 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22
401840 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22

.01 Description:

This specification shall govern the production and construction of bituminous concrete pavement. The following Subsections of the Standard Specifications shall be applicable: 401.01, 401.03 - 401.10, 401.12, and 401.13. All other subsections have been modified herein.

Payment for bituminous concrete shall be in accordance with item 401699. The Contractor shall read and thoroughly understand the requirements of the QA/QC specification as defined in item 401699. It is the responsibility of the Contractor to determine all costs associated with meeting these requirements and to include them in the per ton bids for the various Superpave bituminous concrete items. Payment adjustment factors will be calculated in accordance with the latest version of item 401699.

Bituminous concrete may be produced by one or a combination of several technologies involving asphalt foaming processes and equipment or additives that facilitate the reduction of the temperature at which the mix can be placed and satisfactorily compacted thereby permitting the mix to be produced at reduced temperatures.

.02 Materials:

Use materials conforming to standard specifications 823.

Materials for bituminous concrete shall conform to the requirements of Subsections 823.01, 823.05-823.17, and 823.25 - 823.28 of the Standard Specifications and the following. If the Contractor proposes to use a combination of materials that are not covered by this Specification, the mix design shall be submitted and reviewed by the Engineer 30 calendar days prior to use.

a) **Asphalt Binder:**

Meet the requirements of Superpave performance-grade asphalt binder, as referenced in the Plans, according to M 320 [1], Table 1 and tested according to AASHTO R29 with the following test ranges:

TEST Procedure	AASHTO REFERENCE	SPECIFICATION LIMITS
Temperature, °C	M 320	Per Grade
Original DSR, G*/sin (δ)	T 315	1.00 - 2.20 kPa[1]
RTFO DSR, G*/sin (δ)	T 315	>/= 2.20 kPa
PAV DSR, G*/ sin (δ)	T 315	</=5000 kPa
BBR Creep Stiffness, S	T 313	</= 300.0 kPa
BBR m-value	T 313	>/=0.300

Note 1: The exception to M 320 is that the original DSR shall be 1.00 to 2.20 kPa

Substitution of a higher temperature grade will require prior approval by the Engineer.

The highest low temperature grade virgin binder to be used is -22.

Depending on the level of Recycled materials used, the low temperature properties, per T 313, may be different than stated in M 320 or the previous table.

b) **Recycled Materials:**

RAP (Recycled Asphalt Pavement): Bituminous concrete pavement mechanically processed to a homogenous consistency to be recycled through the production plant for use in a new bituminous concrete mixture.

The percentage allowance of recycled materials (recycled asphalt pavement and/or shingles) shall be controlled through the use of the Materials & Research recycled mixture program available through the Materials & Research Section. The program can be used by the Contractor to determine which materials and combinations of materials can be used to meet the specified material on the contract.

If the Contractor proposes to use a combination of materials that are not covered by this program, the mix design shall be submitted and reviewed by the Engineer.

c) **Shingles:**

RAS (Recycled Asphalt Shingles): Materials reclaimed from the shingle manufacturing process such as tabs, punch-outs, and damaged new shingles mechanically broken down with 100% passing the ½ in (12.5 mm) sieve. Shipping, handling, and shredding costs are incidental to the price of Superpave item.

Post-consumer shingles or used shingles are not acceptable. Fiberglass-backed and organic felt-backed shingles shall be kept separate. Both materials shall not be used in the same mixture at the same time. All shingles shall be free of all foreign material and moisture.

The use of Recycled Asphalt Shingles will be considered for 115 gyration mix designs upon demonstration by the producer of adequate blending of the binder verified by laboratory testing on plant produced material.

d) Mineral Aggregate:

Conform to Section 805 and the following criteria. These criteria apply to the combined aggregate blend.

DESIGN ESAL'S (MILLIONS)	COARSE AGGREGATE ANGULARITY[1] (% MIN)		FINE AGGREGATE ANGULARITY[2] (% MIN)		CLAY CONTENT[3] (% - MIN)	FLAT AND ELONGATED [4] (% - MAX)
	≤ 100 MM	> 100 MM	≤ 100 MM	> 100 MM		
< 0.3	55/-	-/-	-	-	40	-
0.3 to < 3	75/-	50/-	40	40	40	-
3 to <10	85/80[5]	60/-	45	40	45	-
10 < 30	95/90	80/75	45	40	45	-
30	100/100	100/100	45	45	50	10

[1]Coarse Aggregate Angularity is tested according to ASTM D5821.
[2]Fine Aggregate Angularity is tested according to AASHTO TP-33.
[3]Clay Content is tested according to AASHTO T176.
[4]Flat and Elongated is tested according to ASTM 4791 with a 5:1 aspect ratio.
[5] 85/80 denotes that 85% of the coarse aggregate has one fractured face and 80% has two or more fractured faces.

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

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

For any roadway with a minimum average daily traffic volume (ADT) of 8000 vehicles and a posted speed of 35 mph (60 kph) or greater, the polish value of the composite aggregate blend shall be greater than 8.0 when tested according to Maryland State Highway Administration MSMT 411 B ALaboratory Method of Predicting Frictional Resistance of Polished Aggregates and Pavement Surfaces.@ RAP shall be assigned a value of 5.0. The Contractor shall supply all polish values to the Engineer upon request.

e) **Mineral Filler:**

Conform to AASHTO M17.

f) **Warm Mix Additives:**

For any WMA technology requiring addition of any material by the producer during production, the following information will be submitted with the proposed JMF for review and approval at least 30 calendar days prior to production:

1. WMA technology and/or additive information.
2. WMA technology manufacturer's recommendation for usage.
3. WMA technology target dosage rate and tolerance envelope. Support tolerance envelope with test data demonstrating acceptable mix production properties conforming to all sections of this specification.
4. WMA technology manufacturer's material safety data sheets (MSDS).
5. Documentation of past WMA technology field application including points of contact.
6. Temperature ranges for mixing and compacting.
7. Laboratory test data, samples, and sources of all mix components, and asphalt binder viscosity-temperature relationships.

Follow the manufacturer's recommendation for incorporating additives and WMA technologies into the mix. Comply with the manufacturer's recommendation regarding receiving, storage, and delivery of additives.

If the producer performs blending of the WMA technology in their tank, a separate Quality Control plan shall be submitted by the producer to the Department for review and approval at least 30 calendar days prior to production.

g) **Anti-stripping additives**

Conform to standard specifications Section 829 and blend with the asphalt cement in accordance with this specification. Incorporate anti-stripping additives when the Tensile Strength Ratio (TSR) as determined in accordance with AASHTO T283 is less than 80 or when specified for use by the Engineer.

.03 Bituminous Concrete Production – Quality Control

(a) Process Control - Material Production Quality Control.

Submit through electronic mail a QC Plan from each proposed production plant to the Engineer; no hot-mix asphalt material will be accepted until the Engineer approves the QC Plan. This plan must be submitted to the Engineer on an annual basis for review and approval prior to material production. The Engineer will send a signed copy back to the Contractor stating that it is approved. The approved QC Plan shall govern contractor operations.

The QC Plan shall include actions that will assure all materials and products will conform to the specifications, whether manufactured or processed by the Contractor, or procured from suppliers, subcontractors, or vendors. The Contractor shall perform the inspection and tests required to substantiate product conformance to contract requirements. The Contractor shall document QC inspections and tests, and provide copies to the Engineer when requested. The Contractor shall maintain records of all inspections and tests for at least one year. The records shall include the date, time, and nature of deficiency or deficiencies found; the quantities of material involved until the deficiency was corrected; and the date, time, and nature of corrective actions taken.

In the QC Plan shall detail the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of material and construction governed by the Specifications. The QC Plan shall include the following elements as a minimum:

- Production Plant - make, type, capacity, and location.
- Production Plant Calibration - components and schedule; address documentation.
- Personnel - include name and telephone number for the following individuals:
- Person responsible for quality control.

- Qualified technician(s) responsible for performing the inspection, sampling, and testing.
- Person who has the authority to make corrective actions on behalf of the Contractor.
- Testing Laboratory - state the frequency of accuracy checks and calibrations of the equipment used for testing; address documentation.
- Load number of QC samples (1-10 if QA sample is not within trucks 1-10)
- Locations where samples will be obtained and the sampling techniques for each test
- Tests to be performed and their normal frequency; the following, at a minimum, shall be conducted:
  - Mixture Temperature: each of the first five trucks, and each load that is sampled for QC or acceptance testing.
  - Gradation analysis of aggregate (and RAP) stockpiles - one washed gradations per week for each aggregate stockpile; RAP: five gradations and asphalt cement contents for dedicated stockpiles where new material is not being added; one gradation and asphalt cement content test per week for stockpiles where material is continually being added to the stockpile.
  - Gradation analysis of non-payment sieves
  - Dust to effective asphalt calculation
  - Moisture content analysis of aggregates - daily.
  - Gradation analysis of the combined aggregate cold feed - one per year per mixture.
  - Bulk specific gravity and absorption of blended material - one per year per mixture.
  - Ignition Oven calibration - one per year per mixture.
  - Hot-Bins: one per year per mixture.
  - Others, as appropriate.
- Procedures for reporting the results of inspection and tests (include schedule).
- Procedures for dealing with non-compliant material or work.
- Presentation of control charts. The contractor shall plot the results of testing on individual control charts for each characteristic. The control charts shall be updated within on working day as test results for each sublot become available. The control charts shall be easily and readily accessible at the plant laboratory. The following parameters shall be plotted from the testing:
  - Asphalt cement content.
  - Volumetrics (air voids, voids in mineral aggregates [VMA])
  - Gradation values for the following sieves:
    - 4.75 mm (#4).
    - 2.36 mm (#8).
    - 0.075 mm (#200).
    - Operational guidelines (trigger points) to address times when the following actions would be considered:
      - Increased frequency of sampling and testing.
      - Plant control/settings/operations change.
      - JMF adjustment.
      - JMF change (See 401644 Section .04(a)(1)).
      - Change in the source of the component materials.
      - Calibration of material production equipment (asphalt pump, belt feeders, etc.).
      - Rejection of material.

When any point of non-compliance with the QC plan, or material not meeting the Specifications, comes to the attention of either the Contractor or the Engineer, the other party shall be notified immediately, and the Contractor shall take appropriate corrective actions. Failure to take corrective actions immediately shall be cause for rejection of material or work by the Engineer.

The following are considered significant violations to the Contractor's QC Plan:

- Using testing equipment that is knowingly out of calibration or is not working properly.
- Reporting false information such as test data, JMF information, or any info requested by DelDOT
- Failure to perform materials testing per their approved QC Plan
- Deviating from AASHTO or DelDOT testing procedures.
- Use of any material or the use of a JMF component in a proportion that exceeds the allowable tolerance as specified in section 04(a)(1) of this specification not listed in the JMF.
- Use of the wrong PG graded asphalt.
- Failure to take corrective action per action points in the Contractors approved QC plan.

The following steps will be taken for violations listed above:

1. First offence: Written notice of violation to the Contractor.
2. Second offence: Written notice of violation and forfeiture of any bonus (material production or pavement construction) payment eligibility under 401699 section .03 for that production shift.
3. Third offence: Written notice of violation, forfeiture of bonus payment eligibility, and a 5% deduction of payment based upon contract unit price in addition to any calculated pay adjustment factors per 401699 Section 03.
4. Fourth offence: Written notice of violation, forfeiture of bonus payment eligibility, 50% deduction of payment based upon contract unit price in addition to any calculated payment adjustment factor per 401699 Section 03, and immediate suspension of the Contractor until corrective actions are taken. Corrective actions shall be submitted in writing to the Engineer for approval. The Engineer may request a meeting with the Contractor to discuss proposed changes prior to lifting suspension.

Violations of Contractor QC plans shall be kept on record for a period of 1 year from the date of violation at the Central Lab.

(b) Material Production Test Equipment.

Establish, maintain, and operate a qualified testing laboratory at the production plant site of sufficient size and layout that will accommodate the testing operations of both the Contractor and the Engineer.

Facilities for the use of the Engineer and inspectors shall be a minimum of 600 square feet of floor space conditioned to maintain constant temperature of 77F with two windows and a door equipped with functional locks and latches, located such that plant activities are plainly visible from one window of the building. Work space shall be furnished with illumination, tables, chairs, desks, telephone, and water including drinking water, sanitary facilities, fuel, and power necessary to conduct all necessary tests.

Maintain all the equipment used for handling, preparing, and testing materials in proper operating condition. For any laboratory equipment malfunction, the Contractor shall remedy the situation within one working day or the Engineer may suspend production. In the case of an equipment malfunction, the Engineer may elect to test the material at another qualified testing laboratory while waiting for repairs to equipment.

Maintain minimum calibration records for the referenced equipment:
- SUPERPAVE^{R} Gyratory Compactor: once every year; verified once every month by the Engineer.
- Ovens: once every three months, verified once every month.
- Vacuum Container and Gauge (Rice Bowls): once every three months, verified once every month.
- Balances and Scales: once every year, verified once every month.
- Thermometers: once a year; verified once every month.
- Gyratory Compactor molds and base plates: once every year
- Mechanical Shakers: once every year
- Sieve Verifications: once every year

All calibrations shall be documented and on file for review by the Engineer at any time.

(c) Material Production Test Methods

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

.04 Job Mix Formula (JMF)

Mix Design. Develop and submit a job mix formula for each mixture according to AASHTO R35. Each mix design shall be capable of being produced, placed, and compacted as specified. Assign a unique identification number to each JMF.

a) Development of JMF

Gradation: Use the FHWA Superpave 0.45 Power Chart to define permissible gradations for the specified mixture. Type C shall be either a No.4 (4.75 mm), 3/8" (9.5 mm), or 1/2" (12.5 mm) Nominal Maximum Aggregate Size bituminous concrete. Unless otherwise noted in the Plans, the Type C shall meet the 3/8" (9.5 mm) Nominal Maximum Aggregate Size. Type B bituminous concrete shall be the 3/4" (19.0 mm) Nominal Maximum Aggregate Size and the Bituminous Concrete Base Course (BCBC) shall be the 1" (25.0 mm) Nominal Maximum Aggregate Size. Target values for percent passing each standard sieve for the design aggregate structure shall comply with the Superpave control points and should avoid the restricted zone. Percentages shall be based on the washed gradation of the aggregate according to AASHTO T11.

In addition to the results of the material requirements specified above, the following material properties shall be provided by the contractor: bulk specific gravity Gsb, apparent specific gravity Gsa, and the absorption of the individual aggregate stockpiles to be used, tested according to AASHTO T84 and AASHTO T85 and reported to three decimal places along with the specific gravity of the mineral filler to be used, tested according to AASHTO T100 and reported to three decimal places.

Superpave Gyratory Compactive (SGC) Effort:

The Superpave Gyratory Compaction effort employed throughout mixture design, field quality control, or field quality assurance shall be as indicated below. All mixture specimens tested in the SGC shall be compacted to N_M Height data provided by the SGC shall be employed to calculate volumetric properties at N_I, N_D, and N_M

Superpave Gyratory Compactive (SGC) Effort:

DESIGN TRAFFIC LEVEL (MILLION ESAL'S)	$N_{INITIAL}$	N_{DESIGN}	$N_{MAXIMUM}$
0.3 to < 3	7	75	115
3 to < 30	8	100	160
≥30	9	125	205

Volumetric Design Parameters. The design aggregate structure at the target asphalt cement content shall satisfy the volumetric criteria below:

DESIGN ESAL'S (MILLION)	REQUIRED DENSITY (% OF THEORETICAL MAXIMUM SPECIFIC GRAVITY)			VOIDS-IN-MINERAL AGGREGATE (% - MINIMUM) NOMINAL MAX. AGGREGATE (MM)					VOIDS FILLED WITH ASPHALT (%)
	$N_{INITIAL}$	N_{DESIGN}	N_{MAX}	25.0	19.0	9.5	12.5	4.75	
0.3 to < 3	≤ 90.5	-	-	-	-	-	-	-	65.0 - 78.0
3 to < 10	-	-	-	-	-	-	-	-	-
10 < 30	-	-	-	-	-	-	-	-	-
≤ 30	≤ 89.0	96.0	≤ 98.0	12.5	13.5	15.5	14.5	16.5	65.0 - 75.0[1]

Air voids (V_a) at N_{design} shall be 4.0% for all ESAL designs. Air voids (V_a) at N_{max} shall be a minimum of 2.0% for all ESAL designs.

The dust to binder ratio for the mix having aggregate gradations above the Primary Control Sieve (PCS) Control Points shall be 0.6-1.2. For aggregate gradations below the PCS Control Points, the dust to binder ratio shall be 0.8-1.6. For the No. 4 (4.75 mm) mix, the dust to binder ratio shall be 0.9-2.0 whether above or below the PCS Control Points.

For 3/8@ (9.5 mm) Nominal Maximum Aggregate Size mixtures, the specified VFA range shall be 73.0% to 76.0% and for 4.75 mm Nominal Maximum Size mixtures, the range shall be 75 % to 78% for design traffic levels $3 million ESALs.

Gradation Control Points:

The combined aggregates shall conform to the gradation requirement specified in the following table when tested according to T-11 and T-27.

TABLE 1

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

Note: The aggregate's gradation for each sieve must fall within the minimum and maximum limits.

Gradation Classification

The Primary Control Sieve (PCS) defines the break point of fine and coarse mixtures. The combined aggregates shall be classified as coarse graded when it passes below the Primary Control Sieve (PCS) control point as defined below. All other gradations shall be classified as fine graded.

PCS CONTROL POINT FOR MIXTURE NOMINAL MAXIMUM AGGREGATES SIZE (% PASSING)					
Nominal Maximum Aggregates Size	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.5 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm	1.18 mm
PCS Control Point	40	47	39	47	30-60

Plant Production Tolerances:

Volumeric Property	Superpave Criteria
Air Voids (V_a) at (%) N_m	2.0 (min)
Air Voids (V_a) at N_{design} (%)	6.0 (max)
Voids in Mineral Aggregate (VMA) at N_{design}	

Volumeric Property	Superpave Criteria
25.0 mm Bituminous Concrete Base Course	-1.5
19.0 mm Type B Hot-Mix	+2.0
12.5 mm Type C Hot-Mix	
9.5 mm Type C Hot-Mix	
4.5 mm Type C Hot-Mix	

The proposed JMF shall include the following:

Submit for approval to the Engineer the following documentation on Pinepave mixture design software prior to starting production of a new mixture:

1. Job mix formula (JMF) design of the component materials and target characteristic values for each mixture proposed for use. The component materials design shall include designating the source and the expected proportion (within 1 percent for the aggregate components and within 0.1 percent for the other components) of each component to be used in order to produce workable bituminous concrete meeting the specified properties. Recycled Asphalt Pavement (RAP) is one individual aggregate component regardless of fractionation size. Recycled Asphalt Shingles (RAS) is a separate component from RAP.

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

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

4. Plot of the three trial asphalt binder contents at +/- 0.5% gyratory compaction curves where the percent of maximum specific gravity (% of G_{mm}) is plotted against the log base ten of the number of gyrations (log (N)) showing the applicable criteria for N_i, N_d, and $N_{m.}$

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

   % of G_{mm} at N_d, VMA at N_d, VFA at N_d, Fines to effective asphalt binder (P_{be}) ratio, and unit weight (kg/m²) at both N_d and N_m.

6. Summary of the consensus property standards test results for the design aggregate structure, summary of the source property standards test results for the individual aggregates in the design aggregate structure, target value of the asphalt binder content, and a table of G_{mm} of the asphalt mixture for the four trial asphalt binder contents determined according to AASHTO T209.

7. Test data with each JMF and tests performed by a Qualified Laboratory on representative materials, verifying the adequacy of the design. Refer to the specifications for each mix type in order to determine the design requirements. The JMF sieve percentage values shall conform to the ranges shown in Table 1.

   For any mixture that has a 20% or greater failure rate on any combined volumetric criteria, the JMF will not be approved for use on Department contracts.

8. Provide raw material of each JMF so NCAT Ignition Oven calibration correction numbers can be established for the Engineers and Contractors ovens. The Engineer shall provide an ignition oven correction number for each JMF.

.05 Approval of JMF

The Engineer will have up to three weeks once the JMF is submitted to review the submitted information.

All submitted JMF's shall correspond to the Pinepave mixture design software. The Engineer, for evaluation of the submitted JMF, will use the first three test samples. These test results acquired during production shall be within the following range compared to the submitted JMF on the Pinepave mixture design software: Gmm: + / -0.030 and Gmb: + / - 0.040

a) **Design Evaluation:**

The Engineer may elect to evaluate the proposed JMF and suitability of all materials through laboratory trial batches. All materials requested by the Engineer shall be provided at the contractor's expense to the Central Laboratory in Dover in a timely manner upon request. To verify the complete mixture design and evaluate the suitability of all materials, the following approximate quantities are required:

5.25 gal (20 liters) of the asphalt binder;
0.13 gal (0.5 liters) sample of liquid heat-stable anti-strip additive;
254 lb. (115 kg) of each coarse aggregate;
154 lb. (70 kg) of each intermediate and fine aggregate;
22 lb. (10 kg) of mineral filler; and
254 lb. (115 kg) of RAP, when applicable.

For more expeditious approval, the Contractor may undertake the following steps:

1. Submit the proper documentation on Pinepave mixture design software.
2. Produce the new mixture for a non-Department project. The Engineer will test the material, by taking three series per section 401800 03(c). The mixture will be approved by the Engineer for Department projects if the test results are within the specifications.

A new JMF is required when any of the following conditions occur:

- A change in the source of any of the aggregate component materials
- A change in the proportion of any aggregate component by more than 5.0%
- A change in the aggregate components resulting in a change in percent passing any sieve as identified in Table 1 by more than 5% of the JMF target.
- A change in the target AC content by more than 0.20% from the JMF target to maintain other Volumetric properties of the approved JMF.
- For any mixture that has a 20% or greater failure rate on any combined volumetric criteria.

Although a new JMF is not required, the Contractor shall inform the Engineer of any proposed changes to an existing JMF. The Contractor shall notify the Engineer by electronic mail of the proposed changes. This notification shall include the total change made from the approved JMF proportions, and the effective time of the change. The Engineer will reply to the proposed changes within one operational day and notify the Contractor of the effective date of the changes.

.06 Construction.

(a) Pavement Construction Test Equipment.

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

Weather Limitations.

Place mix only on dry, unfrozen surfaces and only when weather conditions allow for proper production, placement, handling, and compacting.

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

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

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

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

Compaction:

(b) Pavement Construction - Process Control.

Perform Quality Control of pavement compaction by testing in-place pavement density by the following methods.

- ASTM D2950 Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods; the use of other density gauges shall be as per the manufacturer's recommendations.
- AASHTO T166, Method C (Rapid Method) Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

Cores may be cut on the first day of paving or once after the change of a JMF for gauge calibration. The number of cores obtained for calibration purposes shall not exceed the number of QA samples obtained by the Department for payment. The Contractor may use any method to select locations for the Quality Control calibration cores.

Repair all core holes in accordance with 401699 Appendix A.

Method of Measurement:

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

Basis of Payment:

All work completed under this item shall be considered for full payment and subsequently modified in accordance with the procedures enumerated under 401699.

Material production quality shall be evaluated per item 401699 - Quality Control/Quality Assurance of Bituminous Concrete .03 (a) Material Production - Tests and Evaluations.

Compaction quality shall be evaluated per Item 401699 - Quality Assurance of Bituminous Concrete .03 (b) Pavement Construction - Tests and Evaluations.

602740 - DRILLING FOR CONCRETE SHAFT (IN SOIL), 30" DIAMETER (LF)
602741 - DRILLING FOR CONCRETE SHAFT (IN SOIL), 42" DIAMETER (LF)
602742 - DRILLING FOR CONCRETE SHAFT (IN SOIL), 48" DIAMETER (LF)
602759 - DRILLING FOR CONCRETE SHAFT (IN SOIL), 54" DIAMETER (LF)
602743 - DRILLING FOR CONCRETE SHAFT (IN SOIL), 60" DIAMETER (LF)
602744 - DRILLING FOR CONCRETE SHAFT (IN SOIL), 72" DIAMETER (LF)

602745 - DRILLING FOR CONCRETE SHAFT (IN ROCK), 30" DIAMETER (LF)
602746 - DRILLING FOR CONCRETE SHAFT (IN ROCK), 42" DIAMETER (LF)
602747 - DRILLING FOR CONCRETE SHAFT (IN ROCK), 48" DIAMETER (LF)
602748 - DRILLING FOR CONCRETE SHAFT (IN ROCK), 60" DIAMETER (LF)
602749 - DRILLING FOR CONCRETE SHAFT (IN ROCK), 72" DIAMETER (LF)

602750 - PERMANENT CASING FOR CONCRETE SHAFT, 30" DIAMETER (LF)
602751 - PERMANENT CASING FOR CONCRETE SHAFT, 42" DIAMETER (LF)
602752 - PERMANENT CASING FOR CONCRETE SHAFT, 48" DIAMETER (LF)
602753 - PERMANENT CASING FOR CONCRETE SHAFT, 60" DIAMETER (LF)
602754 - PERMANENT CASING FOR CONCRETE SHAFT, 72" DIAMETER (LF)

Description:

This work shall consist of all labor, materials, equipment, and services necessary to perform all operations to complete the installation of drilled shafts. The work shall be completed in accordance with the plans, The State of Delaware Department of Transportation Standard Specifications for Road and Bridge Construction dated August 2001, including all revisions and addendums thereof, and this Special Provision. Drilled shafts are deep foundation elements constructed by excavating a circular shaft and casting in-place a reinforced concrete section which is straight and vertical with the minimum diameter specified on the drawings excavated to the termination (depth) criteria stated on the plans.

Materials:

Materials shall meet the following requirements:

A. Hydraulic Cement Concrete

Portland cement concrete shall be 4500 psi minimum and conform to the requirements of Section 812 and Table 812-A, for Class A concrete with the exception that the Contractor shall determine and submit the mix design along with supporting testing for approval. In addition, the mix design shall use No. 8 stone as the aggregate with the addition of high range water reducers (superplasticizers). Where not otherwise specified, ACI 336.1-89 shall be followed. Water used in mixing concrete or slurry shall conform to the requirements of Section 803 of the Standard Specifications.

Concrete shall remain workable and maintain a 4-inch slump for a minimum of four hours after the addition of water or the duration of the pour whichever is greater. Workability shall be verified by an on site slump loss test for concrete placed by tremie method under water or drilling fluid. Concrete shall have a slump value not less than 6 inches or a slump value greater than 1 inch beyond that designated in the concrete mix submittal immediately prior to it being placed in the shaft. A minimum slump of 8 inches is required for concrete placed under a drilling fluid or water. An acceptable water reducing and retarding admixture shall be added to the concrete to produce the specified slump. Under no circumstances shall the admixture cause segregation of the concrete material components. If any admixtures are added to the concrete at the site, the admixture must be added to the concrete by a qualified technician furnished by the Contractor. Immediately after the addition of the admixture, the drum shall be turned a minimum of 30 revolutions, at high mixing speed, until the concrete is thoroughly mixed. The technician shall then test the slump and consistency of the concrete mixture. Under no circumstances shall the Contractor add additional water to the concrete mixture to reach the desired slump. The mix design including any water reducing and retarding admixtures to be used shall be submitted to the Engineer for approval at least 30 days prior to concrete placement.

B. Reinforcing Steel

Deformed reinforcing bars shall be in accordance with the sizes, spacing, dimensions, and details shown on the plans and shall conform to ASTM A615, Grade 60, and the requirements of Section 824 and Section 603 of the Specifications.

C. Temporary and Permanent Casing

Temporary and Permanent Casing pipe shall conform to ASTM A 252, Grade 2 as minimum for temporary or permanent application. Casing shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified diameter of the shaft. With the exception of casing used only to provide safety for persons entering the shaft, the casing shall be of a diameter to fit tightly against the wall of the shaft. The Contractor shall determine the diameter and thickness of casing however no extra compensation will be allowed for concrete required to fill an oversized casing or oversized excavation.

D. Slurry

1. Slurry shall be a stable suspension of mineral or polymer in potable water. The Contractor is responsible for and shall modify the slurry mix as required so as to maintain a stable suspension and stable borehole at all times.

2. Slurry shall be of such consistency that the tremie concrete will readily displace it.

3. Additives shall be used in the slurry if needed to maintain the necessary properties.

4. Slurry shall be mineral or polymer type with the following density, viscosity, and pH. Requests for deviations from the values listed in 1 shall be submitted along with manufacturer recommendations or prior experience documentation to the Engineer for approval.

5. Slurry Testing - Density shall be measured by 68 degrees F by the mud density balance, test method FM 8-RP13B-1. Viscosity shall be measured by the Marsh Cone Method, test method FM 8-RP13B-3. The pH shall be measured by test method FM8-RP13B-4. The sand content shall be measured by American Petroleum Institute method API-13B-1.

Notes for Table 1:

a. Increase density values by 2 lb/ft3 in salt water.
b. Slurry properties shall be monitored at multiple points in the shaft.
c. Higher sand contents during concreter placement will be permitted provide the % sand remains constant for 1 hr prior to concrete placement without agitation.
d. The Contractor shall be responsible to performing slurry testing.

Table 1: Range of Values (at 68° F) for Slurry

Property (Units)	At the Time of Slurry Introduction in the Drilled Shaft	Before Concrete Placement in the Drilled Shaft	Test Method
Density	63 pcf min	75 pcf max	Density Balance
Viscosity (mineral) (polymer)	N/A N/A	45 sec/quart max 50 sec/quart max	Marsh Cone
pH	7 to 11	7 to 11	pH paper or meter
Sand Content % (mineral) (polymer)	N/A	 4% max 1% max	200 Sieve Retain % by volume

E. Access Tubes for Crosshole Sonic Log Testing

Access tubes shall be 2 inch I.D. Schedule 40 steel pipe. PVC tubes shall not be used. The selected pipes must have a round, regular internal diameter free of defects or obstructions, in order to permit a free, unobstructed passage of the source and receiver probes. The pipes must be watertight and free from corrosion with clean internal and external faces to ensure smooth passage of the probes and to secure a good bond between the concrete and tubes. The pipes shall each be fitted with a watertight shoe on the bottom and a removable cap on the top.

Contractor Qualifications:

This work shall be performed under the supervision of the Contractor's Supervisor for the drilled shaft operation, who will be fully knowledgeable and experienced, as defined herein, in the construction of drilled shaft foundations of similar size and in similar geotechnical conditions using the proposed method of drilled shaft installation. Further, the Contractor performing the drilled shaft work and the Contractor's supervisor for the drilled shaft work shall have at least five years experience within the last eight years constructing drilled shafts. The Contractor's equipment proposed for use at the site shall have the demonstrated capacity to successfully complete the work within the specified contract time.

At least 30 days prior to the start of drilled shaft construction, the Contractor shall provide the following documentation of his qualifications, experience record, prior project references, and the availability of the equipment suitable to perform the required work. All references shall be currently available personnel who can verify the quality of the Contractor's previous work and shall include current name, address, and telephone number(s). This documentation shall reference the experience of the drilled shaft Contractor and the drilled shaft Contractor's field supervisor in responsible charge of the drilled shaft operations. As a minimum, this documentation shall include:

1. Experience in the successful installation of drilled shafts of the sizes shown in the plans and employing construction methods similar to those proposed at this site. The minimum experience shall consist of five similar-sized projects in the past five years. At least three of the projects shall be sites with similar ground conditions. The person in responsible charge of day-to-day drilled shaft operations shall have prior experience constructing shafts similar to

those described in these plans and specifications. That person shall have at least five years in the past eight years constructing drilled shafts and at least two years with the current firm.

2. Experience of subcontractor performing the crosshole sonic logging testing. The crosshole sonic logging subcontractor shall have previous experience in conducting crosshole sonic logging tests on at least 5 drilled shaft projects of similar size in the past five years.

This submission shall be made in conjunction with the submittals of the Drilled Shaft Installation Plan. Upon review of the Contractor's qualifications and the Drilled Shaft Installation Plan described hereafter, the Department expressly reserves the right to not approve the drilled shaft Contractor if, in the opinion of the Department, the Contractor's experience, qualifications or equipment is suspect in its ability to complete the work in a timely manner and in accordance with the specifications.

Equipment:

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

The excavation and drilling equipment shall have adequate capacity including power, torque, and down thrust to excavate a hole of the maximum diameter shown on the plans and to a depth of 15-feet or 30 percent beyond the estimated depths shown in the contract documents, whichever is greater. Equipment used for constructing shafts supporting building or bridge structures or installing shafts greater than 60 inches in diameter shall have a minimum torque of 75,000 ft-lbs and apply a minimum of 35,000 lbs of crowd. The drilling equipment shall be outfit with sufficient instrumentation to monitor the depth, crowd and torque on the drilling tool.

The excavation and overreaming tools shall be of adequate design, size, and strength to perform the work shown in the contract documents or described herein. Overreaming may be accomplished with a grooving tool, overreaming bucket, or other method approved by the Engineer.

When the material encountered cannot be drilled using conventional earth augers with soil or rock teeth, drilling buckets, and/or overreaming tools, the Contractor shall provide special drilling equipment including but not limited to: rock core barrels, rock tools, air tools, drop hammers, and other equipment as necessary to construct the shaft excavation to the size and depth required.

The Contractor shall provide equipment suitable for cleaning the bottom of the shaft including flat bottom cleanout buckets, pumps, airlifts, hand equipment or other tools necessary to remove loose material from the bottom of the shaft. The Contractor shall have equipment available to clean the bottom of the shaft both in the dry and under water.

When bottom cleaning and shaft inspection cannot be performed to the satisfaction of the Engineer by the top-hole methods, the Contractor shall provide appropriate safety equipment for their personnel and the Engineer to access, clean and inspect the bottom of the shaft. Equipment shall include but is not limited to: full length safety casing, harnesses, fall arrester equipment, two means of lifting personnel from the shaft, and air monitoring equipment.

When slurry methods are proposed the Contractor shall provide equipment that produces a stable slurry suspension and provides mechanical agitation. The Contractor also shall provide a temporary pipeline or other safe methods to transport slurry and provide equipment that removes detrimental quantities of excavated material from the slurry.

Site Information:

Boring logs from the subsurface investigation are included in the contract documents for use by the Contractor. Data on subsurface conditions are not intended as representations or warranties of continuity of such conditions. It is expressly understood that the Department will not be responsible for interpretations or conclusions drawn from the subsurface information by the Contractor. The data is made available for convenience of the Contractor. The Contractor may make additional test borings and other exploratory operations at no additional cost to the Department.

Prior to bidding, the Contractor shall visit and examine the work site and all conditions thereon and take into consideration all such conditions that may affect this work, in accordance with the requirements of Section 102.05 of the Standard Specifications.

Submittals:

The Contractor shall submit the following to the Engineer for review and approval. Items A through J shall be submitted not less than 30-days before the start of work.

A. List of proposed equipment to be used including cranes, drills, augers, bailing buckets, final cleaning / inspecting equipment, desanding equipment, slurry pumps, sampling equipment, tremie or concrete pumps, casing, and other appurtenances. Include weight of Kelly bar, and O.D. dimensions of down-hole excavating tools.

B. Details of overall construction operation sequence and the sequence of shaft construction in bents or groups.

C. Submit project experience and resumes of the Contractor, Contractor's Drilled Shaft Supervisor, and Subcontractor Qualification.

D. Details of shaft excavation methods, including anticipated lengths and diameters of casings to be installed. Indicate if the intent is to pull or leave the casing in-place. Indicate if the intent is to pour the shaft in a dry or wet condition.

E. When slurry will be utilized, data from the supplier giving the physical and chemical properties of the slurry, details of the method proposed to mix, circulate, desand, and test the slurry.

F. Method of monitoring verticality of the shaft excavation during excavation and details of proposed corrective measures to be implemented as necessary.

G. Methods to clean and inspect the shaft excavation.

H. Details of reinforcement placement including support and centralization methods.

I. The Contractor shall submit a Concrete Placement Plan, including the concrete mix design, including admixtures to be used. Details of concrete placement, curing, and protection. Include method of collecting slurry or water from the excavation.

J. Details of the method to perform integrity testing by Ultra Sonic Crosshole Testing in accordance with ASTM D6760 "Standard Test Method for Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing".

L. Test Reports and logs:
   i. Shaft Installation log including Excavation Log and Shaft Concreting Log
   ii. Pile Integrity Testing Reports.

M. Other information shown on the plans or requested by the Engineer.

The Contractor shall not start the construction of drilled shafts until the Engineer has approved Items A through J. Such approval by the Engineer will not relieve the Contractor of responsibility for results obtained by the use of the Installation Plan or any of his other responsibilities under the contract.

Construction Methods:

A. Protection of Existing Structures

All reasonable precautions shall be taken to prevent damage to existing structures and utilities, in accordance with the requirements of Section 107 of the Standard Specifications. These measures shall include but are not limited to, selecting construction methods and procedures that will prevent excessive

caving of the shaft excavation, monitoring, and controlling the vibrations from the driving of casing or sheeting, drilling of the shaft. Casing shall be installed to a minimum depth of 10 feet when the edge of the shaft is within 10 feet of any structure or roadway. Casing instructed to be left in place by the Department will be paid for in accordance with the appropriate bid item.

B. Construction Sequence

The Design Geotechnical Engineer in addition to the Department's Inspection personnel shall be onsite to observe the excavation of the first shaft excavated by each drill rig. Observation of the cuttings, penetration rates, and drilling pressure will be used in conjunction with the previously obtained subsurface information to verify the indented bearing strata have been penetrated. The Contractor shall notify the Department 2 weeks prior to drilling the first shaft to coordinate inspection.

Excavation of adjacent drilled shafts or other structures or utilities within a radius of three shaft diameters will not be permitted until concrete has been in place for at least 48 hours and the concrete has reached a minimum strength of 500 psi.

Concrete shall be placed immediately after the shaft has been excavated to the required depth, cleaned, inspected by the Engineer and the reinforcement has been placed. The Contractor shall sequence construction to avoid uncased excavated shafts from being open over weekends or breaks in a work week. Uncased excavations shall be completed within 3 days from the start of excavation.

C. Methods of Drilled Shaft Installation

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations shown on the plans or otherwise required by the Special Provisions. The method used shall be suitable for the intended purpose and materials encountered. Generally, either the dry method or wet method, and either temporary casing method, or permanent casing method shall be used as necessary to produce sound, durable concrete foundation shafts free of defects. The permanent casing method shall be used only when authorized by the Engineer. The Contractor shall select and use the method, as determined by site conditions and subject to approval of the Engineer, which is needed to properly accomplish the work. The Engineer shall be notified prior to switching construction method; additional submittals may be required.

1. Dry Construction Method

The dry construction method shall be used only at sites where the groundwater table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation (i.e., less than 3-inches of water accumulates above the final base elevation over a 1-hour period when no pumping is permitted), and where the sides and bottom of the shaft are stable and may be visually inspected by the Engineer prior to placing the concrete. The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation. Where caving occurs or if there is excess seepage into the drilled shaft, the drilling shall be done using an alternate method of construction. Concrete shall be placed in accordance with this provision.

2. Wet Construction Method

The wet construction method, or slurry method, may be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. This method consists of using water or slurry to maintain stability of the hole walls while advancing the excavation to final depth, placing the reinforcing cage, and shaft concrete. Temporary surface casings shall be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation, unless it is demonstrated to the satisfaction of the Engineer that the surface casing is not required. Slurry shall be premixed thoroughly with clean fresh water and adequate time allowed for hydration prior to introduction into the shaft excavation. Adequate slurry tanks will be required. Excavated slurry pits will only be allowed with written permission of the Engineer. Adequate desanding equipment will be required to maintain slurry properties as required by the Materials section of this Special Provision. Steps shall be taken as necessary to prevent the slurry from loosing its fluid properties in the shaft excavation, such as, agitation, circulation, and adjusting the properties of the slurry. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole. In uncased holes the slurry level at all times shall be at least 6-feet higher than the elevation of groundwater.

The Contractor shall carry out control tests on slurry to determine density, viscosity, and pH as required by this Special Provision. Tests to determine density, viscosity, and pH values shall be done during the shaft excavation to establish a consistent working pattern. Testing shall be performed at a minimum of twice per day and as requested by the engineer.

Prior to placing shaft concrete, the Contractor shall clean the excavation and collect slurry samples from the bottom, 10 feet from the bottom and the mid height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The slurry shall be within specification requirements immediately before shaft concrete placement. Concrete shall be placed in accordance this Special Provision.

3. Temporary Casing Construction Method

The temporary casing construction method may be used at all sites where excessive caving or seepage could occur. This method typically consists of advancing the excavation through caving material by the wet construction method as in this provision. When a nearly impervious formation is reached, a temporary casing shall be placed in the hole and sealed in the nearly impervious formation. After the drilling fluid is removed from the casing, drilling may proceed as with the dry method to the projected depth. If it is not possible to maintain the seal of the casing, caving or raveling occurs, then the excavation shall be completed using an alternative method.

As an alternative to use of the wet excavation method, temporary casing may be installed by drilling, driving or vibratory procedures in advance of excavation to the lower limits of the problem material.

Slurry may be omitted at the discretion of the Engineer if it can be demonstrated that the casing can be installed with only minor caving of the hole. Minor caving shall be considered less than 25% increased volume over theoretical shaft volume, for a section not to exceed 10 feet of shaft. If slurry is omitted, casing shall be installed to the final base elevation to allow for inspection of the bearing stratum.

If slurry is omitted while using the temporary casing method, the casing, drilling tools and methods shall be selected such that the diameter of the shaft excavation is no more than 4-inches greater than the outside diameter of the temporary casing. Under no circumstances shall the Contractor intentionally excavate a shaft with a diameter more than 4-inches greater than the outside diameter of the temporary casing being used. In the event that, prior to setting the intended temporary casing, the diameter of the shaft excavation becomes more than 4-inches greater than the outside diameter of intended casing, the shaft shall be excavated or overreamed to a larger diameter which will accommodate installation of the next largest typical casing diameter. If oversized excavations repeatedly develop due to raveling, caving or other ground conditions, the Contractor shall utilize slurry in conjunction with temporary casing.

Clean the excavation and test the drilling fluid for compliance according to the Department specifications. Lower the reinforcing steel cage in place and fill the excavation with concrete. Before the casing is withdrawn and while the casing is being withdrawn, the level of fresh concrete in the casing shall be such that all the fluid trapped behind the casing is displaced upward without contaminating the shaft concrete.

The concrete level shall be maintained a minimum of 10 feet above the bottom of the lowest casing while pulling. Concrete placement and pulling of the temporary casings shall be conducted in accordance with the requirements of this provision.

4. Permanent Casing (Left In-place) Construction Method

When permanent casing is not specifically required on the plans and the Contractor intends to leave casing in the ground, the Engineer shall be notified prior to the start of drilling. Permanent Casing shall only be left in-place when reinforcement arrangements inhibit extraction of the casing. The Permanent Casing method shall not be used for sign structure foundations. This method consists of driving or drilling a casing to a prescribed depth before excavation begins and leaving the casing in place after concrete placement. If the casing cannot be advanced to the prescribed depth prior to beginning excavation operations, the Engineer may require the Contractor to facilitate casing installation by either (1) excavating the material within the casing to the depth that the casing was advanced, or (2) drilling a pilot hole, of a diameter less than 60% of the shaft diameter, down to the final casing depth. In some cases, overreaming to the outside diameter of the casing may be required in order to advance the casing to the prescribed depth. Excavating in advance of the casing will only be permitted when the sides are

sufficiently stable and do not ravel, such that the casing is tight against and cut into the undisturbed soil when advanced. Excavating in advance of casing which will be left in-place shall only be performed when approved by the Engineer.

The casing shall be continuous between the elevations. Overlapping of varying diameter casing will be permitted provided the overlap is sufficient to prevent excessive water infiltration and the intrusion of the surrounding soil.

After the installation of the casing and the excavation of the shaft are complete, the top of the casing shall be cutoff at the prescribed elevation, final shaft cleaning done, and the reinforcing steel and shaft concrete placed within the portion of the casing left in place. Concrete shall be placed in accordance with this provision.

5. Alternative Construction Methods

The Contractor may propose alternative methods to prevent caving and control ground water. Such proposals, accompanied by supporting technical data, shall be submitted to the Engineer for review and approval.

D. Excavations

The Design Geotechnical Engineer shall be on site to observe the installation of the first drilled shaft which supports a building or bridge structure. The bottom elevation of the drilled shaft and rock socket, as shown on the plans, may be adjusted during construction when the Design Geotechnical Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the drilled shaft.

Excavated materials, which are removed from the shaft excavation, and any drilling fluids used, shall be disposed of offsite in accordance with federal, state and local environmental regulations or as directed by the Department.

Sidewall overreaming shall be required when the sidewall of the drilled shaft excavation is determined by the Engineer to have softened due to excavation methods, swelled due to delays in concreting, or degraded because of slurry cake buildup. The thickness and elevation of the sidewall overreaming shall be as directed by the Engineer. Overreaming thickness shall be a minimum of 1-inch. The Contractor shall bear all costs associated with sidewall overreaming. Any drilled shaft concrete over the theoretical amount required to fill any overreaming for shafts, as dimensioned on the plans, shall be furnished at the Contractor's expense.

The Contractor shall provide the necessary equipment to remove and dispose of any materials encountered in forming the drilled shaft and rock socket excavation to the dimensions shown on the plans or as directed by the Engineer.

Bedrock will be defined as a continuous subsurface material which slows the advance rate of the drill rig to less than 4 inches in 10 minutes under 40,000lbs of down pressure (including the Kelly bar and drilling tools) for shafts 48-inches in diameter and less and 60,000 lbs of down pressure (including the Kelly bar and drilling tools) for shafts larger than 48-inches in diameter. When measuring penetration rate, the drilling tools shall be a double cut auger fitted with bullet or chisel teeth and rotated between 20 and 40 rpm.

Drilled shaft and rock socket excavation shall also include removing surface and subsurface obstructions at drilled shaft locations. Such obstructions may include man-made materials, such as old concrete foundations, and natural materials, such as boulders and cobbles. Thin lenses of rock or obstructions less than 12 inches in thickness will not be paid as rock.

Special tools and/or procedures shall be employed by the Contractor after the hole cannot be advanced more than 1-foot in thirty minutes using approved equipment operating at maximum power, torque, and down thrust, using conventional augers fitted with soil or rock teeth, drilling buckets and/or under reaming tools. Such special procedures/tools may include, but are not limited to: chisels, boulder breakers or rock breakers or hammer grabs to break up or lift the boulders intact, core barrels, air tools, hand excavation, temporary casing, and increasing hole diameter. Blasting will not be permitted.

E. Lost Tools

Drilling tools that are lost in the excavation shall be considered obstructions and shall be promptly removed by the Contractor without compensation. All costs due to lost tool removal shall be borne by the Contractor including but not limited to costs associated with hole degradation due to removal operations or the time the hole remains open.

F. Cleaning and Excavation Inspection

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

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

Bottom elevations of drilled shafts and rock sockets shown on the plans are based on design criteria developed by the Engineer and on subsurface conditions depicted on the Engineering Geology sheets included in the plans. The bottom elevations may be adjusted by the Engineer to obtain the required design capacity based on the bearing material encountered during installation of each drilled shaft. The Engineer will be the sole judge as to the classification of the material encountered during drilled shaft excavation.

The Contractor shall not permit any worker to enter the shaft excavation for any reason unless: both a suitable casing has been installed and the water level has been lowered and stabilized below the level to be occupied, and functional and appropriate safety equipment and procedures have been provided to workers entering the excavation as covered under 29 CFR 1910.146. The Contractor shall submit a written permit space program for confined-entry-space in accordance with OSHA 1910.146 to the Engineer for review and approval prior to constructing the drilled shafts.

Prior to placement of reinforcing steel and concrete, the Contractor shall ensure that loose material from the bottom and sides of excavation has been removed, including sediment and water, and that the shaft is within the construction tolerances, listed in this Special Provision.

The Contractor shall test the slurry for compliance with these specifications, collecting slurry samples from the bottom, 10 feet up and at mid height of the slurry prior to placing concrete.

Down hole inspection will not be required for shafts less than 36 inches in diameter or sign foundations.

When wet construction methods are utilized to construct shafts for building or bridge type structures, the Contractor shall provide a submersible inspection devise to verify the bottom conditions for the first shaft installed by each Drilled Shaft Supervisor on the project using these methods. The inspection device shall be capable of capturing a color image of the bottom of the shaft. The device shall consist of a weighted enclosure which can be set on the bottom of the shaft and can evacuate the drilling fluids. The device shall have a vertical scale with ¼" increments. Once the acceptable bottom cleaning methods have been demonstrated, subsequent bottom inspections shall be performed weighted tape, probe rods, or other top hole inspection devices.

Labor and equipment associated with a submersible inspection device, top hole or bottom hole inspection shall be considered incidental to the installation of the drilled shafts.

G. Reinforcing Steel Cage Construction and Placement

The reinforcing steel cage consisting of the steel shown on the plans plus cage stiffener bars, spacers, centralizers, and other necessary appurtenance shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted and prior to shaft concrete placement. Prior to installation of the steel cage in the shaft excavation, inspect and clean the reinforcing steel of materials that may prevent effective bonding. The assembled rebar cage outside diameter shall be at least

6-inches smaller than the drilled hole diameter of the shaft and rock socket, which corresponds to at least 3-inches of concrete cover over the rebar.

The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the steel cage during concrete placement. Concrete spacers or other approved non-corrosive spacing devices shall be used at sufficient intervals not exceeding 5-feet along the shaft excavation. When the size of the longitudinal reinforcing steel exceeds 1-inch in diameter, the spacing may be increased but shall not exceed 10-feet.

Access tube requirements shall be fastened to the reinforcement cage.

H. Concrete Placement, Curing, And Protection

All concrete placement, consolidation and curing activities shall conform to the requirements of Section 602 of Specifications, and the Contractor's approved concrete placement plan, except as otherwise specified herein or as directed by the Engineer

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

Concrete to be placed in dry shafts less than 60-feet in length may be placed by allowing the concrete to free fall into the excavation. Limit the segregation of the concrete by placing the concrete through the use of a tube, sectionalized pipe or other means to direct the free fall of the concrete so that it does not strike the sides or reinforcement of the shaft. Concrete placement by free fall shall be allowed only when the dry method of construction is utilized or the Contractor demonstrates that no more than 3-inches of water accumulate in the base of the excavation over a 1-hour period. If water has infiltrated the base of the excavation, it shall be removed prior to placement of the concrete. No more than 1-inch of standing water shall be allowed in the base of an excavation to prevent segregation of the concrete. If water, trapped in the annular space outside of a temporary casing, enters the shaft as temporary casing is withdrawn, the contractor shall take necessary steps to completely remove all water and sediment from the shaft as well as remove any concrete which has become contaminated or diluted prior to resuming concrete placement by free fall. If water cannot be expediently and completely removed, or the consistency and integrity of the surface of the fluid concrete within the shaft is in question, the Contractor shall switch to placing concrete by tremie or concrete pump. Contaminated concrete shall be removed from the top of the piers at the time of concrete placement.

Concrete to be placed in water or slurry shall be placed through a tremie or concrete pump. The tremie shall be supported so as to permit free movement or permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be sealed closed at the start of work so as to prevent water or slurry from entering the tube before the tube is filled with concrete. After placement has started the tremie tube shall be kept full of concrete to the bottom of the hopper. If fluid enters the tube after placement is started, the tremie shall be withdrawn, the discharge end resealed, and the placement restarted. The flow of concrete shall be continuous until the work is completed. The discharge end of the tremie and pump line shall always be located a minimum of 6-feet below the level of the already placed concrete. As concrete is placed in the excavation, the slurry should be collected and properly disposed of as approved by the Engineer. Tremie pipes shall be a minimum of 10-inch diameter and use with a minimum slump of 8-inches. Tremie pipes shall not have aluminum parts that will react with concrete. Pump hoses shall be a minimum of 4-inches in diameter. All tremie pipe, pump hoses and connections shall be watertight and the end of the line must be rigid and straight.

The concrete placing rate shall be not less than 30 cubic yards of concrete per each 1-hour period. The concrete mix shall be of such design that the concrete remains in a workable plastic state throughout the placement of the concrete and the concrete slump at the end of the shaft pouring still measures at least 4-inches.

Temporary casings shall be removed while the concrete remains fluid and workable. The removal of temporary casing shall not be allowed until the level of the concrete placed in the shaft is high enough to withstand the pressure exerted by the surrounding soil, water or drilling fluid. After concreting begins,

removal of the temporary casing should begin before the concrete begins to set. Telescoping casing may be used but the bottom end of temporary casing shall be located a minimum of 10-feet below the level of already placed concrete. If the concrete begins to set prior to removal of the casing, the removal of the casing should cease and the casing should be cut off at its current elevation and remain in the ground permanently.

When the top of shaft elevation is above ground, the portion of the shaft above ground shall be formed with a removable form or a permanent form when specified.

All concrete, except for that placed under water, shall be vibrated to a depth of 5-feet below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete. After placement, any exposed surfaces of the shaft concrete shall be protected to allow proper curing. Portions of drilled shafts exposed to a body of water shall be protected from the action of water by leaving the forms in place for a minimum of 7-days after concrete placement.

For at least 48-hours after shaft concrete has been placed, no construction operations within 3 shaft diameters from any side of the shaft that would cause soil movement adjacent to the shaft, shall be conducted.

Drilled shaft concrete shall not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

I. Construction Tolerances

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

1. The drilled shaft shall be within 3-inches of the plan position in the horizontal plane at the plan elevation for the top of the shaft.

2. The vertical alignment of the shaft excavation shall not vary from the plan alignment by more than 2.5-inch per 10-feet of depth.

3. After all the shaft concrete has been placed, the top of the reinforcing steel cage shall be no more than 6-inches above and no more than 3-inches below plan position.

4. When casing is used, its outside diameter shall not be less than the shaft diameter shown on the plans. When casing is not used, the minimum diameter of the drilled shaft shall be the diameter shown on the plans for diameters 24-inches or less, and not more than 1-inch less than the diameter shown on the plans for diameters greater than 24-inches.

5. After all concrete has been placed, the top elevation of the shaft shall be within 1-inch of the plan top of shaft elevation.

6. The bottom of the shaft excavation shall be normal to the axis of the shaft within 1/2-inches per foot of shaft diameter.

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

J. Record Information

The Contractor shall provide the Department with the drilled excavation information as recorded. For each drilled shaft foundation installed, the Contractor shall record on drilled shaft installation logs the location, alignment, dimensions, elevation of the top and bottom, depth of the bearing stratum penetration, description of the materials encountered at all elevations, description of any change in excavated material, elevation of the water table during excavation, condition of the bottom of the excavation and bearing surface, slurry test data, concrete data, verticality and deviation from plan location, drilling time for all changing layers, length, diameter and thickness of any casing left in-place,

and other pertinent information to the drilled shaft. The Contractor shall also record the theoretical volume of excavation, volume of concrete placed versus depth, and total volume of concrete placed. The Contractor shall report any observed irregularities to the Engineer immediately upon discovery.

K. Acceptance of Completed Drilled Shafts

The acceptance of each drilled shaft will be the decision of the Engineer, based on the results of the shaft integrity testing report(s) and other information on the shaft installation. Rejection of a shaft based on the shaft integrity testing shall require conclusive evidence that a defect exists in the shaft that will result in inadequate or unsafe performance under service loads. If the integrity test records are inconclusive, the Engineer may require coring or excavation of the shaft to verify shaft conditions. If a defect is confirmed, the Contractor shall pay for all coring or excavation costs and completing grouting of all core holes. If no defect is encountered, the Department shall pay for all coring or excavation costs, including grouting of all core holes.

If testing discloses voids or discontinuities in the concrete which, as determined by the Engineer, indicate that the drilled shaft is not structurally adequate, the shaft shall be rejected and construction of additional drilled shafts shall be suspended until the Contractor repairs, replaces or supplements the defective work, and the Engineer approves the remedial work. Suspension of drilled shaft construction shall remain in effect until the Engineer approves the Contractor's written changes to the methods of drilled shaft construction as necessary to prevent construction deficiencies.

In the case that any shaft is determined to be unacceptable, the Contractor shall submit a plan for remedial action to the Engineer for approval. Any modifications to the foundation shafts and load transfer mechanisms caused by the remedial action will require calculations and working drawings stamped by a registered professional engineer for all foundation elements affected. All labor, calculations, drawings or other documentation and materials required to perform remedial shaft action shall be provided at no cost to the Department and with no extension of the contract time.

Method of Measurement:

Drilled shafts, complete in place, will be measured by the linear foot for each diameter of shaft for the appropriate ground conditions penetrated as listed in the estimated quantities. The length in soil will be determined as the difference between the top of the shaft elevation shown on the plans and either the final bottom of the drilled shaft excavation elevation or the elevation which bedrock, as defined in the Excavation section of this Special Provisions, minus any length of shaft encountering an obstruction, as authorized, complete, and accepted by the Engineer. The length in rock will be determined as the difference between the elevation which bedrock is first encountered in any portion of the shaft and the final tip elevation of the shaft, as authorized, complete, and accepted by the Engineer.

Pre-existing obstructions encountered above the top of bedrock will be measured as a drilled shaft in rock per linear foot of shaft the obstruction is encountered.

Lenses of soil encountered below the top of rock or an obstruction, less than 24 inches in thickness will be measured as rock. Lenses of soil greater than 24 inches in thickness will be measured as soil.

Permanent Steel Casing will be measured by the linear foot for each diameter of shaft as listed in the estimated quantities. The length will be measured as the actual length of casing left in-place not to exceed the length measured for the top of the drilled shaft to the bottom of the deepest casing left in-place. Lengths of overlapping casing will be measured as one length of casing.

Basis of Payment:

Drilled Shafts will be paid for at the contract unit price per linear foot, complete-in-place, and accepted by the Engineer. Such payment will be considered to be full compensation for all costs involved with shaft excavation, using slurry when necessary, removal from the site and disposal of excavated material, the furnishing and placing of concrete and reinforcing steel including all labor, materials, equipment, temporary casing, installing anchor bolts, installing anchor plates, templates, furnishing and installing cross sonic logging steel access tubes in each caisson (all drilled shafts shall include 4 tubes for testing), installing PVC conduits and drain tubes, and incidentals necessary to complete the drilled shafts to the diameters and depths under the Contract Documents for type of ground penetrated.

Additional compensation will not be allowed for concrete required to fill oversized excavations and casings. Unless otherwise specified, all testing required by this specification shall be performed by the Contractor with costs incidental to the various drilled shaft items.

Permanent Steel Casing will be paid at the contract unit price per linear foot, complete-in-place as approved by the Engineer. Such payment will be considered to be full compensation for all costs involved supplying, installing, and cutting off the casing. The unit price for each drilled shaft diameter shall apply for all casing left in-place for that shaft diameter regardless of the actual diameter or thickness of casing installed.

10/ 07/2011

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

Description:

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

Materials:

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

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

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

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

Construction Methods:

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

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

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

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

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

Unless otherwise noted on the Plans, the Guardrail End Treatment Attenuator, Type 1 shall be installed with a 25:1 taper beginning 50' (15 m) from the end of the end treatment.

Method of Measurement:

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

Note: All guardrail end treatment attenuators will be considered as 50 feet (15 meters) long. The 50' (15 m) length will begin at the center of the nose post and extend back along the attenuator and guardrail to which it is attached. Any guardrail within the 50' (15 m) length will be considered as part of the

guardrail end treatment attenuator and not be measured separately. Measurement for the guardrail will begin 50' (15 m) from the center of the nose post of the attenuator.

Basis of Payment:

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

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

8/12/2013

744500 - CONDUIT JUNCTION WELL, TYPE 6, PRECAST POLYMER CONCRETE
744506 - CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE
744507 - CONDUIT JUNCTION WELL, TYPE 8, PRECAST POLYMER CONCRETE
744508 - CONDUIT JUNCTION WELL, TYPE 9, PRECAST POLYMER CONCRETE
744509 - CONDUIT JUNCTION WELL, TYPE 10, PRECAST POLYMER CONCRETE
744520 - CONDUIT JUNCTION WELL, TYPE 1, PRECAST CONCRETE
744523 - CONDUIT JUNCTION WELL, TYPE 4, PRECAST CONCRETE
744524 - CONDUIT JUNCTION WELL, TYPE 5, PRECAST CONCRETE
744530 - CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/POLYMER LID-FRAME
744531 - CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/POLYMER LID-FRAME
744532 - CONDUIT JUNCTION WELL, TYPE 15, PRECAST CONCRETE/POLYMER LID-FRAME

Description:

This work consists of supplying, constructing and installing conduit junction wells as shown on the applicable Plan Sheets or Standard Construction details

Materials:

Concrete shall conform to Section 812, Class B of the Standard Specifications.

Castings shall conform to Section 708.05 of the Standard Specifications.

Frames and lids shall be in accordance with Sections 708 and 744 of the Standard Specifications.

All required hardware and wire for Bonding and Grounding as shown on the Standard Construction or applicable Plan details.

Types 6, 7, 8 and 10 are precast polymer concrete stackable boxes with no base.

Precast polymer concrete is reinforced by heavy-weave fiberglass with a compressive strength of 9,000-15,000 psi, impact energy of 30-72 ft. lbs. and a tensile strength of 800-1,100 psi. Precast polymer concrete should be tested according to the requirements of ASTM Method D-543, Section 7, Procedure 1 for chemical resistance.

All precast polymer concrete covers shall be the heavy-duty type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete cover logo shall bear the inscription "DelDOT" (Types 6, 8, and 10) or "DelDOT TRAFFIC FIBER OPTICS" (Type 7).

Types 11, 14, and 15 are precast polymer frame and lids installed on a precast concrete base. Precast polymer concrete frame and lids shall be the heavy-duty nonconductive type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete lid logo shall bear the inscription "DelDOT ELECTRIC"(Types 11, 14, and 15)

Construction Methods:

The conduit junction well shall conform to the dimensions shown on the Standard Construction or applicable Plan Details, or on the manufacturer's specifications and shall be built so as to ensure that the cast iron frame and lid or polymer concrete box and cover are set level with the surrounding surface when constructed within pavement, sidewalks, pedestrian curb ramps, etc., and set above grade and graded to drain away from the junction well when constructed in unpaved areas. More than one conduit may extend into the well and shall conform to the dimensions shown on the applicable plan sheets or Standard Construction Details. A stone base shall be built for all types of junction wells. Grounding and bonding of the units shall be performed as shown on the plans or Standard Construction details.

Method of Measurement:

The quantity of junction wells shall be the actual number of conduit junction wells by type, that are supplied, constructed, complete in place, and accepted, including cast iron frames and lids with grounding lugs, precast polymer concrete frame and covers, or precast polymer concrete covers, stone base, bonding, grounding, and splicing if required. Frames and lids or precast polymer concrete covers must be installed prior to acceptance of this item.

Payment for all conduits extending into the junction well shall be included in the items for conduit installation.

The length of ALL conduits within a junction well shall conform to the Standard Construction or applicable Plan Details or as directed by Engineer. Payment for cutting existing conduit as directed by Engineer, where a junction well is replaced with a larger type of junction well is included in the bid price. The removal and replacement of cables within the conduits to be shortened shall be handled under other items of this contract.

Basis of Payment:

Payment for conduit junction wells as measured above shall be made at the Contract unit price per each junction well of the type indicated, completely installed and constructed, including excavation, backfilling, and stone base. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

2/29/12

744544 – ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL

Description:

This work consists of adjusting or repairing existing conduit junction wells, including furnishing all materials, in accordance with this specification, notes and details on the applicable Plans, the Standard Construction Details, and as directed by the Engineer. If Bonding and Grounding of the unit is required, that work will be paid for under "Bonding and Grounding Existing Junction Well".

Materials:

Portland cement concrete shall conform to the requirements of Section 812, Class B.
Mortar shall conform to the requirements of Section 611.
Brick shall conform to the requirements of Section 611.
Concrete block shall conform to the requirements of Section 819.

Construction Methods:

Repair of conduit junction wells includes repairing/patching the masonry walls and resetting existing frames and lids or precast polymer concrete covers.

Adjusting involves raising the elevation of the frame and lid to match the grade of the surrounding area.

Method of Measurement:

The quantity of conduit junction wells adjusted or repaired will be measured as the actual number of conduit junction wells adjusted or repaired and accepted. If a new frame and lid or precast polymer concrete cover is needed, it will be supplied under a separate item.

Basis of Payment:

The quantity of conduit junction wells will be paid for at the Contract unit price per each junction well. Price and payment will constitute full compensation for excavating, backfilling, compacting and disposing of excess materials, for furnishing and placing all materials and for all labor equipment, tools and incidentals required to complete the work.

2/29/12

745601 – FURNISH & INSTALL UP TO 3" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
745602 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)
745603 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
745604 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)
745605 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
745606 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)
745607 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (BORE)
745608 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (OPEN CUT)
745609 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
745610 - FURNISH & INSTALL UP TO 4" NONMETALLIC POLE RISER SHIELD

Description:

Furnish and install HDPE, PVC, or Galvanized steel conduits of any size less than or equal to 4 inches in diameter (3 inches or less for Flexible Metallic Liquidtight Conduit) as described below.

Materials:

All conduits shall be UL listed.

HDPE Conduit - 4" or less diameter, high density polyethylene (HDPE) schedule 80, smooth wall conduit with permanently pre-lubricated lining, meeting ASTM D2447, ASTM D3035 and NEMA TC7 specifications.

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

Galvanized Steel Conduit - 4" or less diameter, rigid galvanized steel conduit meeting National Electric Code 2002, Article 344.

Nonmetallic Pole Riser Shield – 4" diameter or less nonmetallic pole riser shield with belled ends meeting NEMA TC-19 specifications.

Flexible Metallic-Liquidtight Conduit – meets National Electric Code 2002, Article 350

Weatherhead for galvanized or PVC conduit – material shall match the adjoining conduit

Insulated grounding bushing with knockouts - meet or exceed UL 514 B

Condulets for conduit sizes - material shall match the adjoining conduit

Anchors - A 307, Galvanized per A 153

One hole conduit hangers - Steel City Series 6H or 6H-B, CADDY CD3B Rigid Conduit Hanger, or approved equal

End caps - material shall match the adjoining conduit

LONG sweep sections for conduit sizes - material shall match the adjoining conduit, and shall be manufactured 90 degree sweeping bends.

Construction Methods:

General Installation Requirements - The Department has the right to reject any installation method proposed for a given work site. PVC shall not be installed under existing pavement unless it is on a continuous roll or with the Engineer's written approval.

Conduit installed underground shall be installed in a straight line between terminal points. In straight runs, junction well spacing shall be no more than 600 feet for fiber optic conduit or no more than 300 feet for copper in conduit, or as directed by the Engineer. If bends are required during installation, they must be manufactured sweeping bends. The Engineer will be consulted before any bends are installed to ensure that the proper arc is provided.

Conduit shall have a minimum cover as measured from the finished grade of 24 inches and a maximum cover of 48 inches.

The opening shall be filled half way with the cover material, and tamped down firmly before filling in the remainder of the opening. Additional lifts shall be used as required to install the metallic warning tape at the specified depth. All cover material shall be free of rocks, debris, vegetation or other deleterious material that may damage the conduit. An underground utility warning tape shall be installed as specified in this section and the remainder of the fill shall be added, tamping down the top layer.

Conduit not terminated to a base or in a junction well shall be terminated 2 feet beyond the edge of the pavement unless otherwise directed by the Engineer, and properly capped. Tape is NOT an approved method. Conduit shall not extend more than 3 inches inside a junction well. See Standard Construction Details or applicable Plan Details for typical methods of termination.

All underground conduits shall be marked in the ground with a metallic warning tape. The marking tape shall be buried directly above the conduit run that it identifies, at a depth of approximately 12 inches below final grade. The tape identifying ALL conduits shall be at least 6 inches wide, and have a minimum thickness of 3 mils and 500 percent elongation.

The color of the metallic warning tape identifying fiber optic cable should be bright orange (preferably AULCC orange), and shall read "WARNING - OPTICAL CABLE" or other wording approved by the Engineer that conveys the same message. The color of the tape identifying all other cables shall be bright red, and shall read "WARNING —BURIED ELECTRIC BELOW" or other wording approved by the Engineer that conveys the same message.

Using conduit tools, rigid metallic conduit shall be cut, reamed, and threaded. The thread length shall be as necessary to ensure that the sections of conduits when screwed into a coupling and tightened correctly will butt together and the joint will be watertight. A three-piece threaded union, as approved by the Engineer, shall be used to join two threaded lengths of conduit in the case where a standard coupling will not work. A threaded union shall not be used in a conduit run that is to be driven. At no time is a threadless coupling or a split-bolt coupling to be used for direct buried conduit.

All lengths of HDPE conduit shall be connected with irreversible fusion couplings. Mechanical and removable couplings will not be accepted.

All lengths of PVC conduit shall be connected by one conduit end fitting inside the flared end of the other conduit section. If this is not possible, then a coupling may be used. Regardless of how connection is made, all joints shall be sealed with the appropriate epoxy to ensure that the two conduit pieces bond to one another to form a solid waterproof link. Using conduit tools, the conduit shall be cut and prepared. If approved by the Engineer, a coupler module may be used where conduit segments do not align properly to allow the flared end of one conduit segment to mate with the normal end of the other segment.

Sealed end caps (with knockouts if empty) shall be placed on the ends of all conduits, after compressed air has been used to clear all foreign matter.

If not already pre-installed by the manufacturer, a polyester or polypropylene pulling rope or tape (fish wire) with a minimum rated strength of 1250 pounds shall be installed in each conduit for future use. In instances where the Contractor installs the cable, the fish wire may be eliminated.

All PVC and HDPE conduits shall have a continuous metallic trace wire installed for the entire length of the conduit run for all fiber installations.

Installation Of Conduit Under Existing Pavement, Directional Bore -

Directional bore shall be used for installation of conduits under existing pavement with a conduit diameter not less than 1-1/2". The size of a bore shall not exceed the outside diameter of the conduit by more than 1 inch. If it does, cement grout shall be pumped into the void. **Only HDPE and/or Galvanized Steel conduit may be installed by Directional Bore methods.**

Installation Of Conduit Under Existing Pavement, Open Cut -

Installation by sawcutting the full pavement depth and removing the existing pavement with an excavator or by hand methods, shall be used only for conduits not less than 1-1/2" diameter. The Engineer must first approve all open cutting of roadways. The width and length of open cut and patch restoration materials shall be as shown on the plan details. The Contractor shall be responsible for the removal of all cut pavement and surplus excavation, and for the replacement and correction of any damaged pavement outside the sawcut limits after the conduit(s) are installed. Asphalt pavement, concrete, base course, sawcutting, and/or borrow from an outside source as required to restore the roadway will be paid for separately under their respective bid items.

Installation Of Conduit Under New Pavement, Unpaved Trench -

Trenching or other approved method shall be used for installation of conduit in unpaved trench or under new pavement. Backfill in conduit trenches shall be compacted thoroughly as it is being placed. At the discretion of the Engineer, sod, that must be removed for the placement of conduit, shall be removed either by the use of an approved sod cutter and then replaced, or 6 inches of topsoil shall be placed and the surface seeded in accordance with Section 908 - Seeding. In areas where new pavement is to be placed or in areas where total reconstruction is taking place, sodding or seeding may not be required by the Engineer. Sodding and/or topsoil from an outside source if required will be paid for separately under their respective bid items. Seeding is considered incidental to the conduit item.

Installation Of Conduit On Structure -

Conduit installed on structure shall consist of drilling anchors into concrete, brick, stone, steel or wood and mounting the conduit with the proper clamps or hangers. The conduit shall be attached to the structure by use of one-hole conduit hangers and approved anchors not more than 36 inches apart. Any 90-degree turns in the conduit run shall be accomplished by placing the proper size and type manufactured sweeping bends for the application needed.

Installation of Nonmetallic Riser Shield or Flexible Metallic Liquidtight Conduit -

Riser Shield and/or Flexible Metallic Liquidtight Conduit installed on wood poles, metal poles, structures, and/or mast arms shall be installed in a straight line. The conduit, when attached to poles, shall be attached with 2-hole straps spaced not more than 36 inches apart with the top-most strap being 12 inches from the weatherhead and the lower-most being 12 inches from the condulet. A weatherhead matching the diameter of the conduit shall be installed on the upper end of the conduit. A condulet of the same size as the conduit being installed, but not smaller than 2 inches shall be placed 48 inches above finished grade. Install two, 2-hole straps of the proper size, evenly spaced below the condulet. Nonmetallic pole risers (U-guard) shall be installed on poles to allow interduct to be connected directly to messenger cable. The underground conduit shall be as close to the base of the pole as possible. If the nonmetallic pole riser or metallic liquidtight conduit is not the same size as the conduit, an adapter shall be used at no additional cost to the Department. The nonmetallic pole riser or metallic liquidtight conduit shall be attached to the pole with 1/4" x 1-1/2" galvanized lag bolts with washers. Lag bolts will be used every 36 inches on BOTH sides of the nonmetallic pole riser or liquidtight conduit, and in the top most and bottom most set of slots. Flexible metallic liquidtight conduit shown on the plans to be installed on mast arms or on metal structure shall also include stainless steel banding placed at a maximum of 5 feet intervals.

Method of Measurement:

The quantity of conduit or riser shield installed as specified, shall be measured as the number of linear feet of each conduit or riser shield installed as specified, complete in place, and accepted.

The length of each conduit installed under existing pavement by a directional bore or by open cutting the pavement shall be measured along the path of the bore or open cut, from the point that cannot be trenched to the point that trenching can resume. The length of any conduit that is reduced or divided (with a junction well or conduit body) shall be measured as part of the larger conduit.

Basis of Payment:

The quantity of conduit or riser shield will be paid for at the Contract unit price per linear foot. Price and payment shall include full compensation for furnishing all conduit and/or riser shield materials, equipment, labor, and incidentals necessary to complete the item.

For conduit installed by Directional Bore, the linear foot payment also includes excavation and backfilling for Bore Equipment, placing the conduit, caps if required, and all other requirements and incidentals listed in the body of this specification.

For conduit installed by Open Cutting existing pavement, the linear foot payment also includes excavating, backfilling, placing the conduit, disposal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For conduit installed in an Unpaved Trench, the linear foot payment also includes excavating, removal of sod if required, backfilling, placing the conduit, disposal of excess materials, replacing excavated on-site sod if required, seeding if required, and all other requirements and incidentals listed in the body of this specification. Sod and/or topsoil furnished from an outside source, will be paid for separately.

For conduit installed on a structure, the linear foot payment also includes furnishing and installing anchors and hangers, removal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For riser shield or flexible metallic conduit installed on poles, mast arms, or structures the linear foot payment also includes furnishing and installing straps, weatherhead, condulet, lag bolts and washers, any other required mounting hardware, and all other requirements and incidentals listed in the body of this specification.

7/20/15

746517 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE
746518 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 35' POLE
746519 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 40' POLE
746520 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 30' POLE
746521 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 35' POLE
746522 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 40' POLE
746618 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 45' POLE

Description:

The work consists of furnishing and installing Aluminum Lighting Standard with Single Davit Arm and/or Aluminum Lighting Standard Pole with Double Davit Arms, breakaway transformer base, luminaires, in accordance with the details on the Plans, and/or as directed by the Engineer to make a functional street lighting system. The foundation will be provided under other items in the contract.

Materials and Construction Methods:

All materials shall be of the best quality and free from all defects. No materials shall be installed until approved by the Engineer. Any material not specifically covered in these specifications shall be in accordance with accepted standards and as directed by the Engineer. Any materials deemed unsatisfactory by the Engineer, shall be replaced by the Contractor.

Lighting standards shall meet or exceed the requirements of the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" based on 90 mph (145 km/hr) wind loads, luminaire weight of 70 lb (32 kg) and luminaire projected area of 3 ft^2 (0.3m^2). Computations confirming conformance with AASHTO Specifications, with the year of the edition specified, shall be submitted to the Delaware Department of Transportation.

All electrical materials shall conform to the requirements of the National Electrical Code of the national Fire Protection Association, and shall conform to all local and special laws and/or ordinances governing such installations. Where these requirements do not govern, and where not otherwise specified, electrical materials shall conform to the Standardization Rules of the Institute of Electrical and Electronic Engineers.

Shop drawings and catalog cuts for all electrical and related materials shall be submitted by the Contractor for approval.

The bolts are to be supplied by the Contractor. The bolts will be installed using a template, and set so that luminaire arm is perpendicular to the roadway.

Anchor bolts, nuts, couplings, washers, and cap screws shall be of carbon steel conforming to the requirements of ASTM A307, and hot-dip galvanized in accordance with AASHTO M 232/M 232M..

New aluminum lighting standards shall consist of a tapered aluminum shaft having a base welded to the lower end. The pole shaft, pole extensions, and davit arms shall each be spun from one piece of seamless tubing, the strut and arm plates shall be extruded, all of which conform to the requirements of ASTM B221 aluminum alloy 6063-T6.

The shaft shall have no circumferential welds, except at the lower end joining the shaft to the base and shall conform to the dimensions listed in the chart below. The shaft shall contain an internal vibration dampening device positioned approximately 2/3 the height of the pole. The top of the lighting standard shaft shall be drilled for two 1/2" (13 mm) lockbolts to secure the davit bracket to the lighting standard shaft. If the pole is not placed on a transformer base, it will have one 3" x 5" (75 mm x 125 mm) handhole which after pole is set should face so that maintainer may view oncoming traffic.

HEIGHT OF POLE	DAVIT ARM LENGTH	OUTER DIAMETER	WALL THICKNESS
30' (9 m)	10' (3.0 m)	10" (250 mm)	0.156" (3.96 mm)
	12' (3.6 m)	10" (250 mm)	0.156" (3.96 mm)
	15' (4.6 m)	10" (250 mm)	0.156" (3.96 mm)
	20' (6.1 m)	10" (250 mm)	0.156" (3.96 mm)
35' (10.5 m)	10' (3.0 m)	10" (250 mm)	0.156" (3.96 mm)
	12' (3.6 m)	10" (250 mm)	0.156" (3.96 mm)
	15' (4.6 m)	10" (250 mm)	0.156" (3.96 mm)
	20' (6.1 m)	10" (250 mm)	0.188" (4.78 mm)
40' (12 m)	10' (3.0 m)	10" (250 mm)	0.188" (4.78 mm)
	12' (3.6 m)	10" (250 mm)	0.188" (4.78 mm)
	15' (4.6 m)	10" (250 mm)	0.188" (4.78 mm)
	20' (6.1 m)	10" (250 mm)	0.219" (5.56 mm)
45' (13.5 m)	10' (3.0 m)	10" (250 mm)	0.188" (4.78 mm)
	12' (3.6 m)	10" (250 mm)	0.188" (4.78 mm
	15' (4.6 m)	10" (250 mm)	0.188" (4.78 mm)
	20' (6.1 m)	10" (250 mm)	0.250" (6.35 mm)

Bracket arms shall be of the davit type consisting of an aluminum shaft having the outer diameter and wall thickness as listed in the table above. The davit arm shall be designed to slip over the top of the lighting standard shaft for a distance of at least 12" (300 mm). The luminaire end of the davit arm shall be fitted with a 2" (50 mm) NPS aluminum pipe not less than 6" (150 mm) long. The height of the lighting standards will be determined by the Contractor to provide a nominal mounting height as shown on the Plans. The length of the davit arm will be as shown on the Plans or 12' (3.6 m) if not specified elsewhere. Davit arm less than 10' (3.0 m) long shall not be used without written permission from the Chief Traffic Engineer.

Each lighting standard shall be provided with a permanent tag which shall be 2" x 4" (50 mm by 100 mm) fabricated from clear anodized 1/16" (1.6 mm) thick aluminum. The edge shall be smooth and corners rounded and the tag shall be curved to fit the light standard shaft. Tags shall be secured to shafts by means of four (4) 1/8" (3 mm) diameter 18-8 stainless steel round head drive screws of self-tapping screws. The embossed identifying letters and/or numerals shall be not less than 3/4" (19 mm) high with stroke of not less than 3/16" (4.8 mm). Identifying letters and/or numerals shall be designated on the Plans.

Transformer Base: Transformer bases, when required, shall conform to the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals".

Before any work, begins the Contractor shall submit documents showing that the breakaway device meets the current AASHTO Breakaway Design.

For breakaway installations, the standard shall electrically disconnect from the supply wire at the foundation when knocked down by an errant vehicle or from some other cause.

Luminaire: The luminaire shall have a precision die cast aluminum housing with an optical assembly, a removable mounting door and of wattage and type as specified on the Plans. The luminaire shall be of the multi-voltage ballast regulator type.

The refractor of the optical assembly shall be attached to the luminaire housing thru a hinge and latch arrangement. The optical assembly shall consist of a highly polished aluminum reflector, and a heat resistant shatter resistant borosilicate glass refractor. The refractor door shall be tightly sealed with an appropriate gasket. The latch for the refractor door shall be of sufficient size to enable easy handling and constructed of rust resistant materials; the latch shall produce an audible click when it is properly locked.

The luminaire shall be equipped with a porcelain, corrosion resistant socket. The socket shall be easily adjustable to give one of twelve different light distributions; such adjustments shall be accomplished through adjusting not more than two screws within the optical assembly. The socket in this installation shall be preset to provide a distribution pattern as indicated on the Plans or type III distribution pattern of luminaire if not indicated.

The luminaire shall have a 2 bolt slipfitting suitable for mounting on 1/2" to 2" (13 mm to 50 mm) pipe. The luminaire shall be designed with a leveling pad and capable of being adjusted $\pm$5 degrees for proper leveling.

The luminaire shall be completely wired so that it shall require only the connection of the power supply cables to a terminal block for energizing the entire fixture.

In order to provide for normal exchange of air between the inside and outside of the optical system, a ventilating channel shall be provided.The channel shall contain a charcoal filter which will prevent the entrance of flying insects and other small animal life forms, as well as provide a cleaning action on the air to remove smoke and dust particles.

All major electrical components, including ballast and the photoelectric control, shall be mounted on a removable door assembly and connected to the fixture electrically through a quick disconnect plug. The removal of the door shall be accomplished by loosening the captive screw and unplugging the quick disconnect plug. The luminaire shall employ solderless push-on type connectors for all wiring connections to facilitate the replacement of any component.

The unit shall contain an integral ballast capable of maintaining the wattage of the H.P.S. lamp throughout the life of the lamp. The ballast and the photoelectric control shall be suitable for operating the units in the wattage as shown on the Plans. The wattage of the luminaires for this Contract are listed on the quantity sheet.

No luminaire shall be installed until the lamp socket position has been inspected and approved by the Engineer. If no light distribution pattern is given the socket position shall produce a light pattern as indicated on the Plans, then type III as designated in the specification for the luminaire. All luminaires shall be adjusted up or down on the slipfitter to provide maximum light on the roadway to be lighted. The connections between the luminaire and service cable shall be made with a connector kit using #10 AWG single wire. Installation of the connector kit shall be in accordance with the manufacturers recommendations.

The Contractor shall furnish and install one or more of the following luminaires or an approved equal as specified on the Plans and/or as required by the Utility owner.

STANDARD MATERIALS

LUMINAIRE 400 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-25 Regulated Multi-voltage Ballast, Type III Light Pattern, or as shown on Plans, 1 1/2" - 2" (38 mm - 50 mm) Slipfitter

Cooper/Crouse Hinds OVY Swing-down	Cat. #OVY40SWW3ET4
GE M-400A Power/Door	Cat. #M4AR40S0A2GMN32

LUMINAIRE 250 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-26 Regulated Multi-Voltage Ballast, Type III Light Pattern, or as shown on Plans, 38 mm - 50 mm Slipfitter

Cooper/Crouse-Hinds OVY Swing-down	Cat. #OVY25SWW3ET4
GE M-250 A2 Power/Door	Cat. #M2AR25S0A2GMS32

LUMINAIRE 100 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-27 120V Regulator Ballast, Type II Light Pattern, or as shown on Plans, 1 1/4" - 2" (32 mm - 50 mm) Slipfitter

Cooper/Crouse-Hinds OVX Swing-down	Cat. #OVX10SK22ET4
GE M-250A2 Power/Door	Cat. #M24R10S1M1AMS21

LUMINAIRE 70 Watt High Pressure Sodium Alley/Security, 120V with Normal Power Factor Ballast, Photo Cell, 9110-60-28 Lamp and Type II Acrylic Lens for Mounting on 1 1/4" - 2" (32 mm or 50 mm) Bracket (Not Included)

Cooper/Crouse Hinds RMA (Specify Less Bracket w/Type II Lens)	Cat. #RMA70SR222LV5
GE Type 201 SA (Specify Less Bracket w/Type II Lens)	Cat. #SAM07S1N5S4LV5ALC

LUMINAIRE 70 Watt High Pressure Sodium Black Colonial, with 120V Photo Cell Receptacle, 120V Reactor 9110-69-34 Ballast, Type III Acrylic Lens, Black Finish with 3" (75 mm) Slipfitter

Cooper/Crouse-Hinds	Cat. #LXF70SR2334
GE TC 100	Cat. #T10R07S1N2AMS3BL
ITT American Rev.	Cat. #47-570E3-6

Installations of Lighting Standards: Lighting Standards shall be installed and located in accordance with the Plans, to provide continuously aligned lighting.

The bracket arms shall be set perpendicular to the edge of the roadway unless otherwise ordered or specified. If necessary aluminum shims may be used to plumb the pole.

Method of Measurement:

The quantity of aluminum lighting standards with single on double davit arms of the size(s) specified will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of aluminum lighting standards with single or double davit arms will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials including concrete, labor, equipment, hardware, anchor bolts, washers, shims and nuts, supply and installation of the transformer base, supply and installation of poles and davit arm(s), and supply and installation of the luminaires. This price will also include all miscellaneous hardware, connector kits, and wiring from the supply cables to the luminaire(s), labor, tools, equipment, and incidentals necessary to complete the work.

6/25/13

746526 - HIGH MAST LUMINAIRE (LED)

Description:

The work consists of furnishing and installing LED High Mast Luminaires in accordance with this specification, the details on the Plans, and/or as directed by the Engineer to make a functional street lighting system.

Materials:

The luminaire shall have a rugged die cast, low copper content aluminum 380 alloy electrical and optical housing that are polyester powder coated with super durable paint for durability and corrosion resistance with a rigorous pretreating and painting process that yields a finish that achieves a scribe creepage rating of 8 (per ASTM D1654) after over 5,000 hours exposure to salt fog chamber (per ASTM B117). A four bolt horizontal arm mount with +/- 5 degree vertical adjustment shall provide 3G vibration rating per ANSI C136. Mast arm mount shall be adjustable for arms from 1-1/4" to 2" (1-5/8" to 2-3/8"). The top electrical cover shall disengage for easy access to LED drivers, surge protection, and terminal block. The LED modules shall be rated to IP66 and the electrical assembly shall be rated to IP65 per IEC60068-2-3. The luminaire shall be UL 1598 safety listed to 40C, wet locations.

The electrical connection shall use quick disconnect connectors for ease of installation and maintenance. 10KV/5KA surge protection per ANSI/IEEEC62.41 shall be provided. The driver shall meet maximum total harmonic distortion (THD) of 20% and be ROHS compliant. A three stage terminal block shall be standard for ease of installation. The luminaire shall have a lumen maintenance factor of greater than 80% at 100,000 hours at 25ºC.

The optical system shall use multi die LED chip on board (COB) technology with Correlated Color Temperature (CCT) options of 4000K and 5000K with a minimum Color Rendering Index (CRI) of 70. The luminaire shall have borosilicate prismatic glass optics to ensure longevity and minimize dirt depreciation providing zero up-light optics. The optics shall also minimize direct view of LEDs, reducing glare. The optical assembly shall be rotatable to align asymmetric distributions with the roadway. The luminaire distribution type shall be as indicated on the Plans. If no distribution type is indicated on the Plans, provide a luminaire with a Type III distribution.

The luminaire shall have a P3, P5, or P7 locking style photocontrol receptacle and photocell, when required by the plans. The luminaire shall have a premium solid state locking style photocontrol (10 year rated life) or extreme long life solid state locking-style photocontrol (20 year rated life), when required by the plans. The luminaire shall have a field adjustable module that adjusts the light output and input wattage to meet site specific requirements, allowing a single fixture configuration to be flexibly applied in many different applications.

The luminaire shall conform to following standards: ANSI/IEEE C62.41:2002 - Surge protection. ANSI C82.77:2002 - Harmonic distortion. ANSIC136.31:2001- Luminaire vibration. ASTM B 117:2003 - Salt spray test. FCC title 47 CFR Part 18 - Federal Communications Commission. IEC 60068 - Environmental testing. IEC 60529:1999 - Degrees of protection provided by enclosure (IP)IEC 61000 - Electromagnetic Compatibility testing (EMC). IEEE 519 - Harmonic control in Electrical Power systems. UL-1598, 40C, Wet Location - Safety listing.

The luminaire shall have a minimum five-year warranty that begins upon transfer to the Department.

Construction Methods:

The luminaire shall be installed accordance with the manufacturer's specified instructions, as directed by the engineer.

All luminaires shall be adjusted to provide maximum light on the roadway to be lighted.

Method of Measurement:

The quantity of all High Mast Luminaire (LED) will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of High Mast Luminaire (LED) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the work.

3/12/2016

746563 - LUMINAIRES (HPS), 1000 WATTS

Description:

This item consists of providing and installing the components of a complete 1000 Watt high pressure sodium lighting fixture, to include the luminaire, ballast, lamp and pole wiring, for mounting on high mast lighting poles, as shown on the Plans or as directed by the Engineer.

Materials:

The lamp fixture and reflector to be used in contract work shall be completely compatible and of the same manufacturer. The lamp fixture and ballast shall be warranted for one year by the manufacturer.

Luminaires

The maximum weight of the luminaire shall not exceed 60 pounds and its projected area shall not exceed 2.5 square feet.

The luminaire shall be an enclosed and filtered design with an optical system consisting of a pressed borosilicate glass reflector and refractor. The reflector shall have a smooth, non-porous inner surface and shall be encased within a spun and sealed aluminum cover. The refractor shall be readily attached to the luminaire housing by means of a stainless steel clamp band equipped with captive stainless steel nut and machine screw. The reflector with its aluminum cover shall be firmly attached to the luminaire assembly by stainless steel bolts with lock washers. All hardware shall be non-corrosive.

The luminaire shall be attached to the bracket arm by means of a bracket entry and lamp support assembly. This assembly shall be cast aluminum and include a side entry gasketed slipfitter designed for 2" pipe with provision for $\pm$3 degrees adjustment for leveling the luminaire. The lamp shall be vertical burning and preventing from undue vibration and backing out by means of a stainless steel lamp clamp attached to the assembly but separate from the socket. The socket shall be a porcelain enclosed, heavy duty, mogul base.

An enclosed terminal block shall be included such that all electrical connections shall be removed from exposure to weather. An aluminum rain shield shall be attached to the outside of this assembly.

The luminaire ballast shall be enclosed within a weatherproof cast aluminum housing which integrally attaches to the top of luminaire bracket entry and lamp support assembly. It shall be readily removable without removing the luminaire from the bracket arm. The ballast shall be pre-wired to the lamp socket and terminal board and have plug-in disconnect leads.

Ballast

The ballast shall be of the type suitable for operation with a 1000 watt high pressure sodium lamp. All ballast components will be accessible from the top with the luminaire mounted and aimed. The ballast shall be prewired to the igniter, lamp socket and terminal board, requiring connection of power supply leads to the terminal board only. It shall be autoregular type ballast with fuse protection and the following characteristics:

Line Voltage :	277 V.
Operating Line Current:	4.0 Amps.
Line Watts:	1104 Watts (approx.)
Power Factor:	.90 (approx.)
Operating Watts:	1000 Watts
Voltage Regulation:	$\pm$10% line voltage fluctuation
Minimum Starting Ambient:	-40° F

1000 Watt High Pressure Sodium Lamp

The 1000 watt high-pressure sodium lamp shall be of type suitable for operation with the luminaire and ballast furnished under this contract. The lamp shall be capable of producing 140,000 lumens at the beginning of lamp life. The lamp shall have a minimum rated life of 24,000 hours at 10 hours per start.

The luminaire when equipped with the 1000 watt high-pressure sodium lamp of compatible manufacturer, shall contain an optical assembly capably of providing the IES Distribution Type as specified on the plans.

Construction Methods:

All high mast fixtures shall be lamped just prior to testing the system. The date of installation shall be marked with the code on the base of each lamp. Each luminaire shall be leveled and secured in all directions. The wiring for each luminaire shall be securely terminated and shall include an equipment grounding conductor to bond the housing to the supply cord grounding conductor.

Method of Measurement:

The number of Luminaires (HPS), 1000 Watt to be measured under this item shall be the actual number of luminaires furnished and installed in accordance with the special provisions, complete in place and accepted.

Basis of Payment:

The number of Luminaires (HPS), 1000 Watt installed, complete in place and accepted, shall be paid for at the contract unit price per each bid for "Luminaire (HPS), 1000 Watts" which price and payment shall constitute full compensation for furnishing all materials, including wiring for luminaires, and for all labor, tools, equipment, and incidentals necessary to complete the item installation.

8/20/10

746590 - FURNISH & INSTALL GROUND ROD

Description:

This item consists of furnishing and installing ground rods at locations shown on the plans or as directed by the Engineer. The item will be used only when an individual ground rod is to be replaced or added as a singular item. Costs for Ground Rods installed as part of other items (Pole Bases, Junction Wells, Metered Service Pedestals, etc.) will not be paid separately, but will be included in those respective pay items.

Material:

Each Ground Rod shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod. The Ground Rod shall be ¾" Diameter and shall have a minimum length of 10', unless detailed otherwise in the contract documents.

Construction Methods:

When installing the Ground Rod, a length of at least 8 feet shall be embedded into undisturbed soil. Measure the ground resistance of each rod before connecting the rod to the grounding conductor. If the measured resistance exceeds 25 ohms, exothermically weld a 10 ft. extension to the top of the first rod and drive to its full depth. Measure the earth resistance again. If it still exceeds 25 ohms, contact the engineer for instruction.

Where rock is encountered and an acceptable earth ground cannot be accomplished by driving as described above, the Engineer may direct the use of a grounding grid. Direct buried rods are exothermically welded end to end to bond lighting standards and structures in continuous series to some point where an acceptable ground can be obtained.

Maintain continuity of the equipment grounding system throughout the project.
Connection to equipment grounding systems shall be made with suitable lugs at all grounding bushings specified, and at the ground lugs in lighting or traffic signal structure access holes or in a breakaway base. Make connections to ground rods as specified in the contract documents. Connections to neutral grounding systems shall be made with grounding lugs.

Measurement and Payment:

Ground Rods will be paid on a per each 10 ft. length. Price and payment includes furnishing, installing, labor, grounding lugs, welding, excavation, backfill, and connecting the ground rod as shown on the plans, standard details, or as directed by the Engineer.

2/29/12

746614 - POLE BASE EXTENSION

Description:

This work consists of furnishing and installing all materials necessary to increase the vertical dimension of the pole base. The extension shall consist of reinforced concrete to a depth in accordance with the notes and details in the Contract Documents and as directed by the Engineer.

Materials:

The concrete for pole base extensions shall conform to Section 812, Class B of the Standard Specifications.

Bar reinforcement shall meet the requirements of Section 603 Grade 60 of the Standard Specifications.

Ground rods shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

All applicable requirements of Section 746 of the Standard Specifications shall govern and be supplemented by notes and details on the plans.

Construction Methods:

Where pole bases are required to extend to a depth greater than that given on Standard Construction Details, they shall be extended as directed by the Engineer.

Reinforcing bars shall be extended in a pattern that complies with the Standard Drawings and matches the pattern of the pole base being extended using continuous vertical bars and is in accordance with Section 603.07 of the Standard Specifications.

The pole base extension shall include a longer length ground rod so that a minimum of 8 feet of rod is driven into undisturbed earth and 8 inches is above the final grade of the pole base.

Method of Measurement:

The quantity of pole base extension will be measured by the cubic feet of concrete required to increase the vertical dimension from the standard depth to the increased depth. The volume will be measured by multiplying the vertical increase in depth by the cross-sectional area of the standard pole base. Reinforcement bars, excavation and backfilling will be incidental to this item and included in the unit price bid.

Basis of Payment:

The quantity of pole base extensions will be paid for at the Contract unit price per cubic foot of pole base extension. Price and payment will constitute full compensation for furnishing and placing all materials including bar reinforcement, ground rod as required, excavation, and backfilling; and for all labor, equipment, tools, and incidentals required to complete the work.

9/30/15

746625 - ELECTRICAL MANHOLE

Description:

This work consists of furnishing and installing electrical manholes in accordance with these specifications and as shown on the plans.

Materials:

The contractor shall submit material, detail and instruction sheets for all pre-manufactured (off-the-shelf) materials described herein in accordance with subsection 105.04 of the Specifications. The submittal shall include data substantiating that proposed materials comply with requirements specified herein. The required elevation of each manhole and handhole shall be determined and submitted as part of the shop drawing data.

Manholes: Manholes shall be reinforced concrete with minimum inside dimensions as indicated for each manhole and a centered entrance opening of 36-inch diameter (minimum). The manhole, cover, and collar shall be capable of supporting truck loads on the cover and all other loads imposed by dry or wet earth. Provide engineering computations "sealed" by a professional engineer registered in the State of Delaware as part of the shop drawing submittals for each size of manhole to substantiate that the manhole design accommodates the following, or equivalent criteria:

Dead Load:
Concrete at 150 PCF.
Earth cover at 120 PCF.
Lateral Earth Pressure on Walls:
Equivalent fluid pressure above the water table at 42 PSF per foot of depth.
Equivalent fluid pressure below the water table at 83 PSF per foot of depth.
Surcharge on walls equal two feet of dry earth.
Live Load:
AASHTO H20 truck loading rear wheel load of 16,000 tons + 30% impact (20,800 lbs. total).
Ground Water:
The manhole design shall be such that a factor of safety of 1.1 is realized.
Design shall assume a ground water table elevation to the top of the manhole.

Manholes shall be custom designed to provide openings for the duct banks of the proper size and location as shown on the drawings. Rubber or PVC waterstops shall be provided around all four sides of the ductbank openings. Manholes shall be provided with a sump pit as indicated. A nonmetallic grill type sump frame and cover shall be installed over the manhole sump. Manholes shall be as manufactured by: Penn Cast, Easi Set, A.C. Miller Products, Inc., Oldcastle Precast, or approved equal.

Manhole Cover and Rim: Frames and covers for manholes shall have inscription, "DELDOT ELECTRIC" as applicable. Frames and covers for manholes shall be rated for AASHTO H20 wheel loads. Covers shall be solid, except for openings to enable placing and removing the cover, and shall be designed to meet standard US Government designs for underground electric or telephone construction. Covers and rims shall be as manufactured by NEENAH Foundry Company, or Equivalent. A minimum of three manhole cover lifting hooks shall be provided to the Department.

Ground rods shall be 3/4-inch (19 mm) in diameter, 10 feet (3 m) long (minimum) and shall be constructed of copper-clad steel. Below-grade connections to ground rods shall be by exothermic weld. Above-grade connections shall be by suitable bolted ground connectors.

Cable Racks: Racks shall be manufactured of a polycarbonate material. Vertical racks shall be capable of supporting Rack Arms 10 inches long at approximately 3" centers. The racks shall be capable of supporting 120 lbs. per arm without the support bracket and 400 lbs. with the support arm. Racks shall be Standard Duty Underground Device Racks by Underground Devices, or equivalent.

Miscellaneous Accessories: Pulling-in irons shall be Line Material Industries, Cat. No. DU 2T3, or Chance Cat. No. 8120, or equivalent. Pulling-in irons shall be installed on each wall of the manhole opposite the respective ductbank entrances and on the underside of the top slab, or as indicated. Bell-ends of the same manufacture as the duct banks shall be provided on the ends of all ducts entering the manholes. Manhole ladders shall be fabricated from aluminum and shall have 2-1/2"x3/8" flat bar stringers and shall be manufactured by Washington Aluminum Company or Reliance Steel Products, Inc., or equal. Safety cages shall be provided for ladders as required by OSHA. Ladder Material shall be alloy 6061-T6 except rungs, which may be 6063-T6.

Construction Methods:

Provide manholes and handholes as indicated. The minimum depth of cover above the top surface of the manhole shall be 18 inches, and where grass or plants are to be grown in the covering material it shall be a high grade of topsoil. The contractor shall be responsible for the structural integrity of each manhole and handhole as installed - including its associated components such as: bearing capacity of the soil or fill supporting it, cast iron cover and rim, masonry collar, manhole and openings through manhole surfaces. The contractor shall repair any damage to associated items resulting from settling of a manhole or handhole after its placement at no cost to the owner.

Installation:

A. Provide a grounding rod in each manhole. The rod shall protrude 6 inches above the floor of the manhole and shall extend into the unexcavated earth below. At least 8 feet of rod shall be in unexcavated earth. The ground rod penetration shall be sealed to prevent the entrance of water into the manhole.
B. Raceways penetrating manholes and handholes shall be sealed in place and manhole surfaces repaired to prevent the entrance of water into the manhole and handholes.
C. Provide a hard gravel (Delaware No. 1 Stone in accordance with section 813 of the standard specifications) filled drain field (one cubic yard minimum) under each manhole. Provide a hard gravel (Delaware No. 1 Stone in accordance with section 813 of the standard specifications) filled drain field (2 cubic feet minimum) under each handhole.
D. Provide a collar between the top surface of the manholes and handholes and the cast iron cover rim such that the top of the cast iron cover shall be flush with the surrounding surface in paved areas and extend one inch above grade in seeded areas at final grade elevations with the area graded to drain away from the manhole. The collar shall be constructed of brick and shall be at least 8 inches thick.
E. Provide vertical cable or wire rack to run from the top to the bottom surface of the manhole. Vertical racks shall be mounted at 2' intervals around the entire interior of the manhole. Provide rack arms, as required, for cable installation.

Measurement and Payment:

Electrical Manhole will be measured and paid for at the contract unit price per each. The payment will be full compensation for the electrical manhole, cast iron cover and rim, lifting hooks, brick collar, grounding equipment and connections, pulling irons, ladders, support members for wire and cable, sumps and grates, sealing of manhole penetrations, gravel drains, excavation, embankment, regrading, shop drawings and submittals; and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

4/7/16

746626 - HIGH MAST LIGHT POLE

Description:

This work shall consist of furnishing and installing high mast light poles in accordance with these specifications and as shown on the plans.

Materials:

High mast light pole working drawings, design calculations, material, detail and instruction sheets shall be provided in accordance with subsection 105.04 of the standard specifications for the high mast light pole and all associated equipment described herein. The working drawings and design calculations shall be certified by a registered Professional Engineer in the State of Delaware. The contractor shall provide a certificate of compliance to prove that all products meet or exceed the specified ASTM, AASHTO, and other requirements.

High Mast Light Pole: High mast light poles shall be designed in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Specification criteria for a 90 mph wind plus 30 percent gust factor. The standard specification for structural supports for Highway Signs, Luminaires and Traffic Signals, 6th edition, dated 2013 and interims thereafter will apply. The pole manufacturer shall furnish the engineer with certified inspection reports. The manufacturer shall maintain a "Traveler" on all major components. The "Traveler" will list material identification, welder identity, test results, and inspector identity. High mast light poles shall be poles assembled using a maximum of three sections of up to 120' requiring no more than two telescoping joints and a maximum of four sections greater than 121' requiring no more than three telescoping joints. The lap joint produced by two telescoping sections shall have a minimum length of two shaft diameters as determined by measuring the minimum diameter of the inner telescoping section. Poles shall be round or 18 sided tapered steel fabricated from high strength low allow steel conforming to ASTM A 1011 (less than ¼") or ASTM A 572 (1/4" and over), minimum yield strength of 60,000 psi. Higher yield strengths may be used, but 60,000 psi shall be utilized for all calculations. Poles shall have a minimum diameter of 6 inches O.D. at top. The pole shall have a uniform taper from top to bottom. Poles shall be hot-dipped galvanized per ASTM A 123. All welding shall be performed by welding operators certified using the procedures from the latest edition of the American Welding Society Structural Welding Code, AWS D1.1 current edition.

- Weld metal shall be E70XX.
- All welding shall be done by the shielded metal-arc, gas shielded fluxcore, gas metal-arc, or submerged-arc process
- There shall be a maximum of one longitudinal weld in the tapered sections of the shaft, which shall be made by automatic seam welding.
- The longitudinal weld seams shall have at least 60% penetration, except in the areas where the shaft section telescopes over another section. In overlapped areas, the weld penetration shall be 100%. No transverse butt welds will be acceptable in fabricating the shaft sections.
- Longitudinal seam welds within 6 inches of pole to base shall be complete penetration welds. Longitudinal seams within 6 inches of a slip joint area shall be complete penetration welds.
- Base plate, circumferential weld joining base plate, and bottom tube sections shall be complete penetration welds.
- Circumferentially welded pole shaft butt splices and laminated pole shafts are not permitted.
- Weld Quality shall conform to AWS D1.1 Section 8. Records of welding procedure and welding operator test results shall be kept by the supplier and shall be available for review by the Engineer.
    - All welds shall be examined visually to ensure compliance with the quality requirements.
    - Fillet welds shall be examined by magnetic particle inspection at a rate of 1' per 5' or portion thereof, of each size and location.

Identification Marker: Each high mast light pole shall be provided with an identification marker fabricated from 1/16" thick, clear anodized aluminum formed to fit the structure, with rounded edges and corners. Markers shall be secured with four 1/8" diameter, 18-8 stainless steel, round head drive screws or self-tapping screws. Markers shall be mounted 6 feet above the pole base and on the pole quadrant facing oncoming traffic. Submit details for approval.

Handhole: Hand hole, secured with a cover, shall be a minimum of 10” wide x 30” tall, reinforced and fabricated from the same grade steel as the pole shaft. A steel winch mounting plate shall be welded inside the pole shaft, opposite the handhole.

Head-frame Mounting Plate: A steel plate shall be welded to the top of the pole for the purpose of directly bolting the lowering device unit head-frame to the pole. Attachment of the head-frame shall be made by lock-nut and bolt (set screws are prohibited).

Base Plates: Base plates and other miscellaneous parts shall be fabricated from ASTM A 572 having minimum yield strength of 60,000 psi. Design the base plate so that water does not accumulate on the top surface of the base plate inside the pole. Hole diameters for anchor bolts shall not be greater than the bolt diameter plus ½”.

Anchor Bolts, Anchor Plates, Washers, and Nuts: anchor bolts shall conform to ASTM F1554 Grade 105. Anchor bolts shall be hot dipped galvanized per ASTM A 153 for at least twice the length of the threads, including the threaded end. Nuts shall conform to ASTM A194 Grade 2H and washers to ASTM F436. Anchor plate shall conform to ASTM A 709 Grade 36.

Head-Frame Assembly: Attach, to the top of each high mast light pole, a head-frame assembly designed to support the luminaire ring with its required number of luminaires, in addition to the cable pulleys and mechanisms. 963.05.02 Mount pulleys and mechanisms on the head-frame assembly; cover with a protective non-corrodible housing. Provide a housing that can easily be removed from the head-frame assembly for servicing of pulleys and other mechanisms. Make necessary cable openings as small as practicable to prevent bird entry. Provide a 24 inch (minimum), nickel-tip, copper lighting rod on each pole, extending at least 20 inches above the head-frame cover and located on, or near, the pole centerline. Ground lighting rod to pole top using #1/0 braided copper using adapters, cable connectors, and grounding lug designed for such purpose. Mount the lighting rod with brass or bronze hardware. Provide pulleys larger enough to contain the various required cables, without exceeding the manufacture or other required bending radii. Fabricate pulleys of either cast steel with nylon bushings or aluminum with a bronze bushing. Pulleys shall have a Type 304 stainless steel shaft. Pulleys shall be equipped with guards to prevent the cable from jumping off the pulley. Furnish a head-frame that provides three point suspension and positive centering and engagement between the mating parts of the head-frame and the luminaire ring assembly. Hot-dip galvanize the head-frame, after fabrication, in accordance with ASTM A 123 or completely zinc-electroplate with an additional 5 mil minimum coating of approved zinc-rich epoxy powder coating.

Latching: Furnish each high mast light pole assembly with a bottom latching device. At least two latching cables shall be used to lock the luminaire ring into place. A visual indicator at each cable attachment shall be provided to verify that the luminaire ring is in the fully raised position.

Luminaire Ring Assembly: Equally space 2-inch luminaire tenons, 6 inches long, around the ring for the number of luminaires required. Hop-dip galvanize the entire luminaire ring assembly after fabrication in accordance with ASTM A 123. Provide a weatherproof male plug wired to the terminal box for energizing the luminaries in the lowered/servicing position. Provide a 30 ampere, four wire type plug to mate with the power receptacle. Provide an enclosure on the ring, in accordance with section 950.13.07, to house the terminal block, fuse block, and lighting arrestor. Enclosure shall be rated NEMA 4. Provide guide rollers or pads to cushion excess swing during raising and lowering operations. The downward travel of the lowering ring shall be sufficient to lower the lights to a position 5 ft. above the base of the standard.

Winch Assembly: Provide a self-locking, permanently lubricated, worm gear winch assembly, enclosed within the pole mast, capable or raising and lowering the entire luminaire ring, with luminaries, at a rate of approximately 15 feet per minute, when driven by a portable electric winch drive. Provide a drive unit of a size and speed determined by the load and required raising and lowering speed, without exceeding 50% of the capacity of the worm gear assembly or the drive unit. Provide a winch that remains locked in any position so that the luminaire ring assembly cannot fall under its own weigh if the operator interrupts the raising or lowering operations. Provide a winch designed to assure proper spooling of the cable upon the drum at all times.

Hoist Cables: Furnish the size and length hoist cable require, made from stainless steel aircraft cable, meeting Military Specifications MIL-C-5424A-1. Hoist cables shall be oversized to the maximum extent possible such that they fit and operate with all reels and pulleys that are part of the lowering assembly. Attach support cables to a self-leveling yoke, to which is attached to the winch cable from the winch drum. Provide guide cables or other acceptable means to prevent cable entanglements in the pole shaft.

Miscellaneous Hardware: Furnish and install miscellaneous hardware of stainless steel, ASTM A 167, type 304.

Electrical: Furnish and install a 30A-3P-480/277V Y circuit breaker, rated >24,000 AIC. Install circuit breaker in base in handhole. Furnish and install NEMA L22-30 locking receptacles and outlets for connection of loads, power winch, and loads when in servicing position. Power cable shall be Type SO, 5 conductor, 10AWG. Luminaire feeds, from terminal, board, shall be 3 conductor 14 AWG Type SEO.

Electric Winch Drive: Drive shall be portable, heavy duty, industrial-rated, reversible, electrical drive system. Provide a drive with a torque limiter that cause drive slippage at a predetermined torque load to prevent damage to cables, winch, or other portions of the lowering device system. Provide sufficient length of cable and mating plug to directly utilize the power supply within the pole. Equip the drive to attach to the winch drive shaft and the pole so the drive is complete self-supporting. Furnish a drive that operates from a remove switch, with sufficient cable length so the operator can stand a safe distance outside the radius of the luminaire ring assembly. The electric winch drive shall operate from 277V. A transformer may be used, however, no component of electrical the winch drive may exceed 50 pounds. The electric winch drive shall not be required to be disassembled into less than 5 components for storage. The luminaire frame assembly shall be raised and lowered with a minimum speed of 10 feet per minute. Provide two spare winch drive units (total of three) to the department.

Construction Methods:

The loading, transporting and unloading of all parts shall be conducted to avoid injury and deformation of the metal. Repair areas damaged in transport or erection to the satisfaction of the engineer. During the erection process, handle all materials carefully and store on platform, skids, or other supports to keep parts off of the ground. The steel shall be kept free and clean from all foreign materials, particularly grease, oil, concrete, chock marks and dirt that may affect the natural oxidation of the steel. All structures shall be treated with care given to any product such that the finished surface remains as prepared in the fabrication shop. Any foreign matter that gets on the surface after galvanizing shall be removed as soon as possible and the soiled areas shall be returned to the conditions as listed above.

The area around the foundation of a high mast pole shall be cleared of debris to facilitate the raising and lowering of the luminaire ring. All branches and vegetation that might interfere with the raising and lowering of the luminaire ring shall be removed.

The following procedure shall be used for tightening the anchor bolt nuts:

- Verify that the nuts can be turned onto the rods well past the elevation of the bottom of the leveling nut and backed off without the use of a cheater bar.
- Apply Loctite 277 to the mating parts. Follow manufacturer’s instructions for the application and use.
- Place the leveling nuts on the rods and make level.
- Place the leveling nut washers.Place the pole end frame and position with a crane.
- The pole is plumbed or the base plate is leveled.
- Place top nut washers.
- Apply Loctite 277 to the top nuts and tighten to a snug-tight condition in a star pattern.
- Check if beveled washers are required. Beveled washers are required if any face of the base plate has a slope greater than 1:20 and/or any nut cannot be brought into firm contact with the base plate. If beveled washer(s) is required, remove the top nut(s) as necessary and install the beveled washer(s). Retightened the top nuts in a star pattern to a snug-tight condition.
- The reference position of the top nuts should be marked on the nut and the base plate at each bolt. The top nuts shall be tightened in ¼ turn increment in a star pattern for two tightening cycles. The full nut rotation shall be ½ turn.
- The load shall be released from the crane.

- A torque wrench shall be used to verify the minimum torques listed below for that size anchor bolt:
  - Anchor Bolt Dia. 1 ¾" 3.8 inch-kips
  - Anchor Bolt Dia. 2 ¼" 4.9 inch-kips
  - Anchor Bolt Dia. 2 ¾" 5.9 inch-kips

  Torques shall be checked prior to Loctite setting.
- A painted black stripe shall be applied to each top and anchor nut and the base plate so all nuts can be easily checked for movement.

Upon completion of the erection and following the installation of the luminaries and all electrical components, and prior to acceptance, the lowering device shall be tested on each standard. The test shall consist of two complete operations starting with the latching or unlocking, lowering, raising, and latching or locking. The test shall be considered satisfactory when 80 percent of the operations required no second attempt, and 20 percent required no third attempt. Should the equipment fail this test, the equipment shall be repaired, or modified by the contractor as needed, and all standards shall be retested.

The Contractor shall minimize exposure to private property and public right-of-ways of danger from inadvertent pole and/or crane movements during the erection process. If any portion of the pole fall zone is within private property, the contractor shall notify the owner and take appropriate protective measures. The contractor shall be responsible for ensuring that traffic and/or pedestrians are not within the fall zone while the pole is supported on the crane. This may involve street closures or coordinated traffic drags. The contractor shall be responsible for any damage and/or injuries that occur as a result of any accidental movements of the crane or pole. It shall be the contractors responsibility to verify the pole fall circles in the field based on the proposed pole height, surrounding terrain, and the contractor operations.

Measurement and Payment:

High Mast Light Pole will be measured and paid for at the contract unit price for each high mast light pole complete and in place, fully operational and accepted. The payment shall be full compensation for all material, including but not limited to, anchor bolts, head-frame assemblies, winch assembly, electric winch drives, cables, wiring, terminal board, junction box, electrical connectors, circuit breaker, lamps, pulleys, structural steel, welding, inspection, testing, certification, engineering, calculations, assembly, erection, electrical connection; and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Spare winch drives will not be measured and paid for separately, but will be considered incidental to the overall Contract.

4/7/16

746627 - FURNISH AND INSTALL 1-CONDUCTOR #1/0 AWG (15KV, ERP, MV-105) STRANDED COPPER

Description:

This work consists of furnishing, installing, splicing and terminating a complete system of primary feeder conductors for the electrical installation in accordance with these specifications, as shown on the plans and as directed by the Engineer.

Materials:

The contractor shall submit material, detail and instruction sheets for all cables, splice kits, termination kits and other associated materials in accordance with subsection 105.04 of the Specifications. The submittal shall include data substantiating that proposed materials comply with requirements specified herein. In addition, the Contractor shall also submit all information to Delmarva Power for review and approval. Single Conductor Shielded Medium Voltage Cables: Cables shall be stranded copper conductor, extruded semiconducting thermosetting strand screen, ethylene-propylene rubber (EPR) insulation, extruded semiconducting thermosetting insulation shield, uncoated copper shielding tape and polyvinyl chloride jacket. The cable shall be Type MV-105, Sunlight resistant, 133% insulation level. Cables shall be capable of operating continuously in both wet and dry locations at a conductor temperature of 105° C for normal operation, 140° C under emergency operation conditions and 250° C under short circuit conditions. The conductor shall be Class B compressed or compact stranded annealed uncoated copper in accordance with ASTM B-3, ASTM B-8, B496. Cables shall comply with the requirements of UL 1072, AEIC CS8, ANSI/ICEA S-97-682 NEMA WC 74. The strand screen shall consist of an extruded semiconducting thermosetting compound applied over the conductor. It shall be of a material compatible with the insulation, shall be uniformly and firmly bonded to the overlying insulation, and shall be free when stripping from the conductor and the extruded conductor screen. The insulation shall be a high quality, heat-moisture, ozone and corona-resistant high dielectric strength ethylene propylene rubber compound. Strand screen, insulation, insulation screen shall be made by triple extrusion method. It shall be suitable for operation in wet or dry locations. The nominal thickness of the insulation shall be 220 mils for 15 KV cable. The metallic shield shall be nonmagnetic consisting of an uncoated copper tape of minimum average thickness of 5 mils that is helically applied over the insulation shield with a nominal 25 percent overlap. A polyvinyl chloride jacket shall be tightly extruded over the underlying core. The jacket thickness shall comply with ICEA S-93-639/NEMA WC74. The overall jacket shall be printed at intervals not exceeding 24 inches with the following information:

Manufacturer's name
Plant of manufacture (designation code)
Trade name
Insulation type and thickness
Conductor size and type
Maximum working voltage and insulation level
Type designation of cable (MV-105)
UL identification -"UL"
UL rating(s) as applicable
Year of manufacture

Cable shall be as manufactured by General Cable, Okonite Company, Prysmian, or approved equal. Cable Splices: Provide IEEE 404-2012 or later compliant spice kits, capable of properly splicing cables specified to existing cables and that are also compliant with IEEE Std 592-2007 or later shield resistance and fault-current initiation testing requirements. Splice kits shall contain all necessary components to reinstate the strand shield, primary cable insulation, metallic shielding and grounding systems and overall jacket to the equivalent of the cable itself. Splices may be constructed from heat-shrinkable or cold shrinkable splice accessories with proof of recent or current manufacture hands-on, installation training. Splice kits shall be factory engineered and factory tested for partial discharge and A.C. withstand per IEEE 404-2012 "Production Testing" and shall accommodate a wide range common cable sizes. Kits shall allow splicing with different types of insulation, conductor sizes, and shielding construction. Kits shall accommodate commercially available standard connectors. Cable splices shall be Raychem, 3M, Elastimold or approved equal.

Load Break Cable Terminations: Modular system, complying with IEEE 386, with disconnecting, single-pole, cable terminators and with matching, stationary, plug-in, dead-front terminals designed for cable voltage and for sealing against moisture. Load-Break Cable Terminators shall be elbow-type units with 200-A-load make/break and continuous-current rating; coordinated with insulation diameter, conductor size, and material of cable being terminated.

Shielded Cable Terminations: Comply with the class ratings of IEEE 48. Insulation class shall be equivalent to that of cable. Include shield ground strap for shielded cable terminations. Provide class 1 terminations, modular type, furnished as a kit, with stress-relief tube; multiple, molded-silicone-rubber, insulator modules; shield ground strap; and compression-type connector.

Bushing Well Inserts: IEEE 386, 200 amperes, 15 kV Class. Provide a bushing well insert for each conductor cable termination at a transformer unless indicated otherwise.

Parking Stands: Provide a parking stand near each bushing. Provide insulated standoff bushings for parking of energized high-voltage connectors on parking stands.

Connectors: Comply with ANSI C119.4 for connectors between aluminum conductors or for connections between aluminum to copper conductors. Copper-Conductor Connectors shall be copper barrel crimped or copper shear bolt connectors.

Load Break Cable Terminations, Shielded Cable Terminations, Bushing Well Inserts and Parking Stands shall be Elastimold, Joslyn Hi-Voltage, Richards Manufacturing Co., Hubbell Power Systems Inc., Cooper Industries or approved equal.

Cable End Sealing Caps: provide cold-shrinkable or heat-shrinkable crosslinked polymeric and sealing caps capable of sealing cables specified. End caps shall be able to accommodate a wide range of cable sizes. Cable end sealing caps shall be Raychem, 3M, Elastimold or approved equal.

Pulling compound: Pulling compound shall be UL approved, "Y-ER-EASE" or approved equal. Soap, Grease or any substance other than specified shall not be permitted.

Construction Methods:

The cable installer shall be trained and certified by the splice and termination material supplier to install, splice and terminate cables specified herein.

Identify each feeder in each manhole with a 4"x1"x1/16" brass tag, secured around feeder, having stamped letters ¼" high stating the feeder designation. Install all cables on existing and new cable racks in manholes. All medium voltage cables exposed in manholes shall be individually arc proofed then bundled into feeders with nylon tie wraps. Materials utilized shall not deteriorate when subjected to environments encountered in underground installations, that is, water, gases, sewage, oil and fungus. Materials shall be self-extinguishing, shall not support combustion, and shall be 3M "No. 7700" arc-proofing tape or equal. Installation shall be in accordance with manufacturer's recommendations. Provide minimum of 10% spare termination and splice kits of each type.

Install cable splices joining segments of cable. Install cable terminations at the ends of all conductors. Manufacturer shall provide illustrated step-by-step instructions describing installation.

Factory Test: Tests shall be performed on completed cable at the factory in accordance with ICEA S-97-682 and AEIC C8 as follows:

Conductor resistance
AC withstand
IR constant
Corona level

Certified test reports shall be supplied for all cables. Manufacturer shall provide a test report demonstration design-proof testing of terminations per IEEE 48 and capability of passing IEEE 404 test sequence. Manufacturer shall provide a test report demonstration accelerated and real-time testing of weathering resistance including track and U.V. resistance, as well as termination stability with time,

temperature, and stress variation. Manufacturer shall provide a test report demonstrating design-proof testing of splices according to IEEE 404, and water submersion testing according to ANSI C119.2. Results of cable test with terminations and splices installed shall be indicated in tabular form and in plots of current versus voltage for incremental voltage steps, and current versus time at 30-second intervals at maximum voltage.

Field Tests: Before final connections perform tests on all new feeders newly spliced or terminated as hereinafter specified under testing. No tests shall be made on existing cables. An independent testing company shall perform the tests. The testing company shall be a member in good standing with the National Electrical Testing Association (NETA), and shall perform all inspection and tests in accordance with specifications and standards of NETA, ANSI, and IEEE. The testing company shall maintain a written record of all tests and upon completion of project, assemble and certify a final test report. The tests shall be as follows:

Apply C.C. hypotential test to each conductor.
Measure the resistance of the cable shields to verify continuity.

Measurement and Payment:

Furnish and Install 1-Conductor #1/0 AWG (15KV, ERP, MV-105) Stranded Copper will be measured and paid for at the contract unit price per Linear Foot. The payment will be full compensation for the stranded copper cable, splice kits, load break cable terminations, shield cable terminations, bushing well inserts, parking stands, connectors, cable end sealing caps, cable tape, pulling compound, cable identification, spare splice and termination kits, submittals, testing and reports; and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

3/15/2016

746843 - POLE BASE, TYPE 1
746844 - POLE BASE, TYPE 2
746845 - POLE BASE, TYPE 2A
746846 - POLE BASE, TYPE 2B
746847 - POLE BASE, TYPE 3
746848 - POLE BASE, TYPE 3A
746849 - POLE BASE, TYPE 3B
746850 - POLE BASE, TYPE 4A
746851 - POLE BASE, TYPE 4B
746852 - POLE BASE, TYPE 6

Description:

This work consists of constructing and furnishing round or square pole bases Types 1, 2, 2A, 2B, 3, 3A, 3B, 4A, 4B, and 6 for poles in accordance with the Standard Construction Details and at locations as directed by the Engineer.

Materials:

The concrete for pole bases shall conform to Section 812, Class B.

Bar reinforcement shall meet the requirements of Section 603 Grade 60.

Ground rods shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

Conduit for sweeps shall meet the requirements for galvanized rigid steel conduit in Section 745.

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

"Drop-in" Expansion Anchors and Bolts for Type 4A Pole Bases shall be provided by the Contractor. The anchors shall be stainless steel and shall accept ½" diameter stainless steel bolts. Anchors shall be Concrete Fastener Systems Model DIS 12, Hilti HDI SS 303, or approved equal.

Construction Methods:

The bases shall conform to the dimensions as indicated on the Standard Construction Details. A ground rod shall be installed as shown. A minimum of 8 feet of the ground rod must be driven into undisturbed soil.

If a utility or a right-of-way conflict is found when a Type 2 or Type 3 base is specified in the Plans, an alternate base of equivalent strength may be used as directed by the Engineer. A Type 2 base has two equivalents, namely Types 2A and 2B. A Type 3 base has two equivalents, namely Types 3A and 3B.

Though the contract calls for the use of a round pole base, the Contractor may use a square base at its discretion.

The end of the conduit sweeps in the ground shall be extended outside the concrete and any forms or sheeting by 12 inches and capped or connected to the existing conduit. If the conduit is to be capped underground for future use, it must be sealed with a galvanized threaded conduit plug. Tape is NOT an approved conduit plug. The location of the conduits shall be marked on the base with arrows drawn in the wet concrete within 6 inches of the outer edge.

Excavation for the pole bases may not exceed the dimension of the foundation by more than 12 inches in any one direction. If a form is used in the excavation more than 18 inches below the ground surface, it is necessary that the area between the form and excavation be filled with Borrow Type C and tamped on all sides in continuous, horizontal layers not to exceed 68 inches in depth, loose measurement.

Where a pole base is to be placed in existing concrete pavement such as a sidewalk, the concrete shall be saw cut in a square pattern or removed to the nearest joint. In other pavement material, a round hole may be cut using an appropriate tool. Any damage to the existing pavement shall be repaired at the Contractor's expense and shall meet the approval of the Engineer. Any removal or replacement of any type of pavement under this item shall be an incidental cost to this item.

The bases shall be edged and have a broom finish.

Where water or highly unstable material is encountered during the excavation for the pole base, pole base sheeting may be required and the following steps shall apply:

1. The condition exists in the upper half of the excavation. Stop all work until the Bridge Design Section reviews the condition.

2. The condition exists below the upper half of the excavation:
   a. For a proposed Type 4A or 4B Base, increase the depth to 4 feet.
   b. For a proposed Type 1, 2, or 3 Pole Base, substitute a Type 3A Pole Base for all but a Type 3B Pole Base. The depth of the base shall be as determined in (d) below, or 9 feet, whichever is greater.
   c. For a proposed Type 6 Pole Base, substitute a Type 2 Pole base and increase the depth in accordance with (d) below.
   d. Determine the depth of the base, which would be in the unsatisfactory area. Multiply that depth by 0.7 and add the result to the original required depth of the base to obtain the final depth of the base. The reinforcing bars shall be extended using the required pattern to match the final depth in accordance with the requirements of Section 603.07 of the Standard Specifications.

Method of Measurement:

The quantity of pole bases will be measured as the actual number of bases constructed, complete in place and accepted. Concrete, excavation and backfilling around the base, ground rods, and the two conduit sweeps in the base are included in this item.

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

Payment for any additional sweeps shall be paid for separately under the appropriate conduit items. The Contractor's use of square base rather than a specified round base shall not result in any additional cost to the Department.

Basis of Payment:

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

Any increase in the vertical dimension required herein shall be paid for separately under Item 746614, Pole Base Extension; another item of this contract.

The quantity of pole bases will be paid for at the Contract unit price for each pole base type. If an alternate pole base type is selected by the Engineer, payment will be the Contract unit price for the alternate selected. Price and payment will constitute full compensation for furnishing and placing all materials including concrete, ground rods, and a minimum of two conduit sweeps extending into the base; for excavating, backfilling and compacting around the base; for repairs to damaged existing pavement; for removal or replacement of pavement; and for all labor, equipment, tools, and incidentals required to complete the work.

746872 - LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE

Description:

This work consists of furnishing all materials and installing light panels, meters, control and distribution equipment for the park and ride parking lot lighting.

Materials:

LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE.

Lighting Control and distribution equipment enclosures shall be dead front type weatherproof metal enclosed self-supporting structures, as specified in the Contract Documents. Free standing enclosures shall be fabricated from sheet aluminum and shall be as specified herein. Panel and control equipment cabinets shall be the manufacturer's standard enclosure for the type and application specified.

Circuit Breakers. Circuit breakers shall be molded case type having a minimum rating of 22,000 amp interrupting capacity (AIC) and be quick make, quick break, thermal magnetic, trip indicating, and have common trip on all multiple breakers with internal tie mechanism. They shall have the current and voltage ratings and number of poles as specified in the Contract Documents, and shall be treated to resist fungus and be ambiently compensated for the enclosure and proximity to adjacent breakers. All circuit breakers shall be the bolt in type.

Photoelectric Controls. Photoelectric controls shall be solid state, cadmium sulfide type with hermetically sealed silicone rectifier rated 277 volts, 60 cycle AC and 1000 watts maximum load. Built in surge protection shall be provided, and a fail safe operating feature shall be included so that the lighting circuits will remain energized in the event the photo control components become inoperative. Nominal operating levels of this control shall turn on at a minimum vertical illumination value of 3 FC (32 lux) and turn off at a maximum vertical illumination value of 6 FC (65 lux). These limitations shall be set by the manufacturer, and tolerances of plus or minus 20 percent for the specified value will be acceptable. Photoelectric controls for luminaires and lighting controls shall be twist lock type. A suitable mounting bracket with locking type receptacle and all other necessary mounting hardware
shall be furnished.

Contactors and Relays. Contactors of the current ratings and number of poles specified in the Contract Documents shall be held by permanent magnets. They shall be fully rated for all classes of load to 600 volts AC and shall have an interrupting rating of 600 percent of rated current. A HAND-OFF-AUTOMATIC selector switch shall be provided in the photoelectric cell circuit. Relays shall be the type, size and contact ratings as specified in the Contract Documents.

Panel Boards. Panel boards shall conform to Federal Specification W-P-115 and shall be suitable for operation on the voltage and type service specified in the Contract Documents. They shall be listed and labeled by the Underwriters' Laboratories, Inc. Panel boards shall be equipped with the number and size circuit breakers specified. Circuit breakers in panel boards shall conform to Federal Specification W-C-375 and shall be bolted to copper busses. Buss ratings shall be as specified. Panel shall be provided with modular Transient Voltage Surge Suppressors. (TVSS).

Lightning Arresters. Lightning arresters shall be secondary type, having the specified number of poles and 0-650 volts RMS. Arresters shall be provided with suitable mounting brackets and all other necessary mounting hardware.

Control Power Transformers. Control power transformers shall be the dry type, two windings, of the size and voltage ratings specified in the Contract Documents.

Enclosures. Enclosures shall conform to the NEMA 3R. They shall have door clamps, solid neoprene gaskets, welded seams, stainless steel external hardware and continuous hinges with stainless steel pins. Enclosures shall have two weepholes in the bottom and shall be equipped for padlocking.

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

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

Thermostats and Fans. A thermostatically controlled cooling fan shall be provided for all cabinets. The fan and thermostat shall be rated for 125 percent of capacity and they shall be mounted at the top of the cabinet.

(a) Thermostats shall be the inline type, single pole, 120 volts, 10 amps with a minimumrange of 40 to 80F.
(b) The fan shall have a minimum rated capacity of 100 CFM air flow and a minimum rated design life of 100,000 hours.
(c) The thermostat shall be manually adjustable, within a 10 degree range, from 70 to 160F.

Method of Measurement:

This number of Lighting Control and Distribution Enclosure to be measured under these items shall be that actual number in accordance with these special provisions complete in place and accepted.

Basis of Payment:

The number of Lighting Control and Distribution Enclosure as determined above, shall be paid for at the contract unit price bid for each item "Lighting Control and Distribution Enclosure" installed in accordance with the requirements contained herein, complete in place and accepted, which price and payment shall constitute full compensation for furnishing all materials, including panels, control devices concrete pad foundation and for all labor and equipment necessary for the installation of the electrical equipment specified.

10/27/2009

746901 - UNDERPASS LUMINAIRE

Description:

This work consists of furnishing and installing an underpass luminaire in accordance with the locations, notes and details on the Plans, this special provision, and as directed by the Engineer.

Materials:

General

The complete luminaire shall operate a lamp of the type and wattage as indicated on the plans when connected to a power source of the type and voltage as specified on the plans. The luminaire shall contain a prewired integral ballast and an optical assembly. The luminaire shall be UL/cUL Listed SUITABLE FOR WET LOCATIONS. Standard construction is IP55.

Mechanical Construction

The luminaire shall include a two-piece die-cast aluminum housing with an electrocoat dark bronze paint finish and polycarbonate resin refractor. There shall be weatherproof neoprene gaskets around the refractor edge and the wiring and mounting holes. Mounting shall be by two 3/8-inch (9.5mm) bolts through provided back holes or to a 4-inch (102 mm) outlet box. There shall be 3/4-inch (19mm) conduit entrances with built-in clamps provided on the sides for through-feed wiring. The luminaire shall have standard and vandal-resistant screws provided to secure the refractor to the housing. Removal of the refractor shall allow direct front access to the lamp, socket, ballast and reflector. The luminaire shall have provisions for a field-installed photoelectric control kit and internal glare shield.

Ballast Operation

The luminaire shall have an auto-regulating multi-volt ballast capable of operating at the voltage indicated on the plans. The ignitor and ballast shall be prewired to the lamp socket requiring connection of power supply leads only. The ballast shall reliably start and operate the lamp in ambient temperatures down to -40°F for HPS.

Optical Assembly

The luminaire shall have a lamp with wattage as shown on the plans and an optical distribution as shown on the plans. The optical assembly shall include a precisely molded prismatic polycarbonate resin refractor and top and rear aluminum reflectors with an Alzak finish. The optical assembly shall contain a medium base socket with lamp. The top reflector shall be drilled so as to accept field installation of an internal glare control shield if specified on plans.

Construction Methods:

The Contractor shall provide to the engineer for approval working drawings of the proposed underpass luminaire demonstrating that they meet the requirements of this special provision and notes and details on the plans.

Installation of the underpass luminaire shall be accomplished by experienced workmen in accordance with the manufacturer's recommendations. The luminaire shall be mounted to the bridge structure in accordance with the notes and details on the plans, and as directed by the engineer.

Method of Measurement:

The quantity of "UNDERPASS LUMINAIRE" will be measured as the actual number of each actual number of each installed and accepted.

Basis of Payment:

The quantity of "UNDERPASS LUMINAIRE" will be paid for at the Contract unit price per each for "UNDERPASS LUMINAIRE", which price and payment shall constitute full compensation for furnishing all materials and installation of a complete and operational underpass luminaire, working drawings, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

4/10/16

746906 - FURNISH & INSTALL 4-CONDUCTOR #18 AWG SHIELDED OPTICOM CABLE
746907 - FURNISH & INSTALL 1-CONDUCTOR #2 AWG STRANDED COPPER
746908 - FURNISH & INSTALL 1-CONDUCTOR #4 AWG STRANDED COPPER
746909 - FURNISH & INSTALL 1-CONDUCTOR #6 AWG STRANDED COPPER
746910 - FURNISH & INSTALL 1-CONDUCTOR #8 AWG STRANDED COPPER
746911 - FURNISH & INSTALL 1-CONDUCTOR #10 AWG STRANDED COPPER
746912 - FURNISH & INSTALL 1-CONDUCTOR #14 AWG STRANDED COPPER
746913 - FURNISH & INSTALL 2-CONDUCTOR #14 AWG ALUMINUM SHIELDED COPPER
746914 - FURNISH & INSTALL #6 BARE STRANDED COPPER GROUND
746915 - FURNISH & INSTALL #8/2 WIRE UF W/GROUND
746916 - FURNISH & INSTALL #8/3 WIRE UF W/GROUND
746918 - FURNISH & INSTALL #2/0 AWG STRANDED COPPER
746919 - FURNISH & INSTALL #4/0 AWG STRANDED COPPER
746920 - FURNISH & INSTALL 14/4 TRAFFIC CONTROL CABLE
746921 - FURNISH & INSTALL 14/9 TRAFFIC CONTROL CABLE
746922 - FURNISH & INSTALL 14/16 TRAFFIC CONTROL CABLE
746923 - FURNISH & INSTALL 14/5 TRAFFIC CONTROL CABLE

Description:

The pay items listed above include furnishing, installing, and splicing if approved, the various types and sizes of cable in conduit, or overhead and lashed to a span wire. All conduit installation will be paid for under their respective items.

Materials:

Cable - All electrical cables shall be manufactured in conformance with the National Electrical Code, 600-Volt, UL approved.

1. Stranded or solid, single conductor copper cables shall be XLP Insulated; USE or RHW rated
2. Type UF cable shall include ground and the number and size of conductors as shown on the plans. Use cable conforming to ANSI/UL 493.
3. 14/4, 14/5, 14/9, 14/16 AWG Solid copper conductor Traffic Signal cable shall conform to IMSA Specification Number 19-1. Provide wire size and number of conductors as shown on the plans or as directed by the Engineer. Additional material requirements for Traffic Signal Cables are as follow:
   a. If requested, the Contractor shall provide independent test results to verify specification compliance. Costs of testing are incidental to the Cable item being supplied.
   b. All cables shall be supplied on reels with each reel containing one continuous length of cable.
   c. Color code to be used as established by IMSA Specifications. In addition to IMSA, DelDOT requires that individual tracers contrast with the base color to allow easy identification between each base color and the same base color plus tracer.
      To test for sufficient color contrast, remove the sheath for a length of 6 inches. All filler material and tapes shall be removed for the same length. All conductors of the same base color will be placed side by side and all other conductors will be hidden. The conductors will be held against a white or ivory surface and viewed from a distance of 6 feet. The base color, tracer, and tracer color must be identified within a period of three seconds after being placed in position. The same test for contrast will also be made for base colors. If either the base color or tracer color test fails, the material will be rejected.
   d. The tracer line width shall not exceed 3/20 inch when measured perpendicular to the edge of the line. Also, the total width of tracer lines on a conductor may not be equal to or greater than one-half the total circumference of the conductor.
4. Aluminum Shielded Cable shall be shielded two conductor controlled capacitance cable enclosed in an aluminized polyester shield within a polyethylene jacket, rated to 600 volts. The two conductors are AWG # 14 stranded copper. Cable shall meet IMSA 50-2. Referred to as “Home-run Cable”.

5. Opticom Cable – must meet the manufacturer's recommended specifications

Splicing Materials –

1. Insulating (rubber) tape shall be of the self-bonding type and shall be 3M Company, Inc. (Cat. No. 130C, 2228); Plymouth Rubber (Cat. No. 2212); Permacel (Cat. No. 253, P280), or an approved equal.

2. Jacket (plastic) Tape shall be of the waterproof type and shall be 3M Company, Inc. (Cat. No. 33); Plymouth Rubber (Cat. No. 3117); Permacel (Cat. No. P29), or an approved equal.

3. For overhead traffic control cable splices:
Wire Nuts – Ideal 74B or 76B, 3M Highland H-33, or approved equal

Cable Installation

Installation in Conduit:

This work consists of installing various types, sizes, and number of communications or electrical cable(s) in existing conduits, which may or may not contain an existing communications or electrical cable(s) or wire(s). Conduits may be located underground, within mast arms, on wood poles, or on metal poles.

The number of cables to be pulled through each conduit will be as shown on the plans or as directed by the Engineer.

Construction Methods:

All cable must be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of wire or cable from this position is prohibited. Avoid damaging cable insulation when removing cable from drums or reels, or during installation of the cable.

Hand pulling methods are required for conduit sizes of 1-1/2" or less and are **preferred** for all other sizes. Dynamometer is recommended for use when pulling other than by hand.

Prior to installation, **written approval by the Engineer is required** for the use of any power-assisted methods of pulling communications or electrical cable(s) or wire(s) into conduit. A short piece of material that will part if the strain exceeds the amount specified below shall be used between the pulling grip and the pulling medium, unless industry standards require less:

150 lbs. for all pulls up through 12 pair communications cable; and
300 lbs. for all larger cables

Any and all cable(s) pulled into any conduit without the use of an acceptable pulling grip, Kellems or equal, and without the use of a strain release element or by using methods which may have or did result in pulling forces in excess of strain release material, or using methods which may have or did result in pulling forces in excess of those set forth herein or prescribed by industry standards are **unacceptable.**

Any and all unacceptable cable(s) shall be removed and replaced with new cable(s) using correct methods at no cost to the Department.

The installation of cable(s) in existing conduits shall be accomplished by pulling the cable(s) through the conduits. If required, pulling lubricant of the type recommended by the cable manufacturer will be used. The cable(s) shall be prepared for pulling by reeling them from their respective reels as they enter the conduit or by taking sufficient length from the reel(s) to comprise the set to be pulled. Care shall be taken to avoid damaging insulation and to eliminate any twists or kinks and to marry the cables in a straight lay. Care shall also be taken to prevent entry of moisture into the cable at all times during installation. Cable ends will be sealed using rubber tape and painted with a sealing type of waterproof compound until final splices are made.

The cable(s) shall be hand fed into the conduit. When, in the opinion of the Engineer, additional radius is required to prevent damage to the cable(s) a sleeve shall be used. There shall be no additional payment made for sleeves or their use.

Underground cable runs shall be started at one terminal point and shall be continuous without splices to the final terminal point except for "Home Run Cable" to "Loop Detector Wire". Opticom cable shall not be spliced in any application.

Additional cable(s) shall be left and arranged in a neat and orderly manner as noted:

1. When pulled through junction wells, 6 feet of copper cable, supported on cable rack assemblies
2. At the control box and other splice locations, 6 feet of cable, neatly arranged and laced with cable ties

When cable already exists in a conduit, the Contractor shall ensure that the placement of a fish does not damage or entangle the existing wire or cable(s). The lead end of a fish shall contain a blunt terminal. Bending and/or taping the end of the fish shall not be satisfactory nor shall any termination which contains rough edges or any sort of hook that might engage an existing wire or cable when the fish is extracted.

Where two or more wires occupy the same conduit, they shall be drawn in together and kept parallel to each other by means of a pulling head. Phase legs shall be arranged circumferentially and in sequence around the neutral wires.

All conduit ends shall be duct sealed after cable installations.

Installation on Span Wire Overhead:

This work consists of installing electrical cable on an existing span wire.

Construction Methods:

All electrical cable must be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of wire or cable from this position is prohibited. Avoid damaging cable insulation when removing cable from drums or reels, or during installation of the cable.

The electrical cable will not be spliced at the top of the pole but will continue on to be taped onto the span wire. The electrical cable shall be oriented so water will not run along its length and run into the steel pole. The electrical cable shall be installed on the underside of the span wire with no crossover or wraps around the span wire. The electrical cable shall be pulled tight without any kinks and the jacket (plastic) tape wrapped tight around the span wire and electrical cable at least six wraps every twelve to fourteen inches.

At each signal head location, there will be a loop of signal cable 36 inches long.

Splicing:

Traffic Control Cable and Single Conductor Stranded Wire :

General – Traffic signal cable splicing shall only be made above ground in pole hand-holes, transformer bases or on span wire at the signal head. Underground traffic control cable splices (except between loop detector wire and "home-run" cable) or splices in between conduit runs are prohibited. After cables have been installed and pending permanent splicing, the end of each section of cable in the control box and at all splice locations shall be carefully sealed, using rubber tape, and painted with a sealing type of waterproof compound. The circuit number of all cables and wires shall be identified by color coded tape attached to each of the cables and wires in the control box and at all splice locations. The color coded tape shall be secured to the cable or wire with nylon cable ties. Any splices found to be faulty within 90 days of installation shall be remade at the Contractor's expense. Insulation from each conductor to be spliced shall be removed to expose ½ inch of copper. Use of any tool or method which might nick the conductor is prohibited. Each conductor not being spliced shall be inspected and trimmed

so that the conductor does not extend beyond the insulation. After each conductor to be spliced is connected, all conductors both used and not used shall be returned to their original configuration before the insulation was removed and then sealed as specified.

Individual cables shall not extend beyond the splice of the last signal head for each signal phase.

Shielded Opticom cable shall not be spliced.

Shielded Aluminum Cable ("Home-Run cable") may be spliced only with the loop detector wire in a junction well. No splicing of the "home-run cable" outside of this junction well is permitted.

Overhead - Conductors to be electrically connected shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection shall be effected. A proper size wire nut shall be installed and hand tightened. If necessary to cover all the copper, minor trimming may be done. The copper splice shall be 5/16 inch long when trimmed. Care shall be taken to ensure that no insulation is caught up in the copper area of the splice. It is essential that the splice be kept dry. Therefore, care must be taken during taping and by placement of the completed splice to prevent water from entering the splice between or around the cables.

1. **Termination of cable (Butt Splice) -** The sheath of each cable shall be removed as necessary. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in a butt position and all wires and wire nuts shall be positioned to ensure that no shorts exist and that the splice area is reduced to as small a diameter as possible. Taping shall begin with rubber tape two inches over the intact sheath. Taping shall proceed toward the other cable overlapping half of the tape width until a point two inches on the other cable sheath has been reached. Taping shall then be repeated in the other direction starting one tape width wider than the previous wrap. Where necessary to cover all areas of the splice, overlapping shall be increased. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The rubber tape shall be covered with plastic tape applied in the same fashion.

2. **Taps or Tee Splices -** The sheath of the through cable shall be removed for a distance of 8 inches centered on the point of splice. The sheath of the branch cable(s) shall be removed for a distance of 4 inches. The through cable conductors which are to be joined to the conductors of the branch cable(s) are to be separated out from the others and cut. No other conductors shall be cut for any purpose. Depending upon the need, the branch cable(s) may be placed beside one of the through cables and the splicing proceed or the through cable may be doubled back so that the parts of the through cable and the branch cable(s) are placed side by side. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in approximately their final position and an inspection for shorts shall be made. After all wire nuts and wires are properly positioned, taping shall begin on the through cable 2 inches from the end for the sheath. It shall proceed with 1/2 inch width overlap across the splice area and onto the other through sheath for a distance of 2 inches. The taping shall start at the end point and return back across the splice to the branch cable(s). It shall proceed along the branch cable(s) and onto the sheath for a distance of one inch. A return along the branch back to the main cable shall be made and the remaining part of the splice shall be taped continuing as before. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The cables shall be placed in their final position and taped with two fully overlapped passes of plastic tape. Plastic tape need not cover the interior areas covered by the rubber tape. The splice shall be placed so that the branch cable(s) enters the splice from below to prevent water from flowing along the branch cable(s) into the splice area.

3. **Termination End of Cable –** Dead ended cables shall have 3" of sheath removed. Each individual cable shall be rubber taped then bundled and re-taped with vinyl tape and coated with waterproofing compound.

Method of Measurement:

The quantity of cable will be measured as the actual number of linear feet of cable furnished and pulled through conduits (underground, in mast arms, or on poles) or installed on a span wire in accordance with these specifications, complete in place, and accepted.

All required cable slack left at termination points or in junction wells shall be measured as part of this item.

Basis of Payment:

The quantity of cable furnished and pulled through all conduit (underground, in mast arms, or on poles) or furnished and installed on a span wire will be paid for at the Contract unit price per linear foot of the applicable pay item. Splice installations and all costs related to the splice shall be incidental to the linear foot payment of the cable being spliced. Price and payment will constitute full compensation for all labor, equipment, tools, materials, material testing, splicing, taping, and incidentals required to complete the work as specified above.

7/14/14

746952 - FURNISH & INSTALL ELECTRICAL UTILITY SERVICE

Description:

Electrical service equipment consists of the equipment necessary to connect a utility company service to a traffic control device cabinet, lighting control cabinet, traffic monitoring station cabinet, or other traffic control device cabinet. Provide electrical service equipment at the phasing and amperage specified in the Contract Documents. This work includes coordinating the connection with the local utility company.

Materials:

Meter Sockets:

Provide either ringed or ringless type meter sockets as required by the utility company. If a meter is not required, provide a ringless socket with suitable shunts and a metallic cover plate. Provide stainless steel hardware for attaching the meter socket to a cabinet, wood post, or other structure.

Disconnect Switches:

Disconnect switches shall be NEMA standard KS 1-1990. The disconnect switch enclosure shall be Type 4 stainless steel, with external operating handle, enclosure cover interlock, and external switch mechanism handle with provisions for securing in both the ON and OFF positions by padlock. The switch mechanism shall be of heavy duty design with quick make, quick break type operations and visible blades. The disconnect switch shall be fusible with integral fuse puller. Single phase disconnect switches shall have 2 poles with solid neutral and shall be rated at 240 Volts. Three phase disconnect switches shall have 3 poles with solid neutral and shall be rated at 600 Volts. The design of the neutral bar may be factory or field installable.

Construction Methods:

Utility Connection - Before any control equipment or material is ordered, arrange a meeting with the utility company representatives, Signal Construction Inspection representatives and the Engineer to establish a schedule for utility connections. Do not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of the utility company's facilities. Make the utility service connection to the point of service supplied by the utility company. Make the necessary arrangements with the utility companies to ensure having needed utilities available at the time of turn on. Delays due to utility energization, connection, or disconnection will not be a basis for time extension. Report any difficulties in securing utility company services to the Engineer as soon as possible.

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

Measurement and Payment:

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

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

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

Utility connection coordination with the utility company will not be measured, but the cost will be incidental to other pertinent items. Utility company energizing, connection, and disconnection costs will be the responsibility of the Department.

749687 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON SINGLE SIGN POST

Description:

This work consists of installing or removing traffic sign(s) on a single post or other type of pole at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in boring holes constructed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than or equal to 48 inches shall be installed on multiple sign posts under Item 749690 - Installation or Removal of Traffic Sign on Multiple Sign Posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project

Method of Measurement:

The number of single sign installations or removals will be measured as the actual number of signs installed or removed and accepted.

Basis of Payment:

The quantity of single sign post installations or removals will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed in accordance with the Delaware MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

5/28/2013

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DEPARTMENT OF TRANSPORTATION
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DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

UTILITY STATEMENT
January 13, 2016
STATE CONTRACT # T2015-090-02
F.A.P. # ENHS-2015(27)
P6#15-42800
I-95/ I-295/ I-495 INTERSTATE
HIGH MAST LIGHTING IMPROVEMENTS
NEW CASTLE COUNTY,

LOCATION: I-95/ I-295/ I-495 Interchange

New Castle County Special Services;

New Castle County Special Services maintains an underground sanity sewer force main under I-295, 1000 feet north of the Pedestrian Tunnel shown on plan sheet LI-01. The Contractor is advised to use caution when working in the vicinity of this facility.

Delmarva Power Transmission;

Delmarva Power Transmission maintains overhead electrical high voltage structures crossing I-295, just north of the Pedestrian Tunnel shown on plan sheet LI-01. The Contractor is advised to use caution when working in the vicinity of this facility and to maintain a minimum of 25 feet from all Delmarva Power Transmission lines and structures.

Del DOT:

Del Dot maintains ITMS, fiber, lighting and/or signal systems throughout the project limits. The Contractor must use care when working in these areas. Any adjustments to Del DOT facilities shall be performed by the State's contractor in accordance with the Standard Specifications as directed by the District Engineer.

Utility adjustment and/or relocation involvement is not anticipated. Should any conflicts be encountered during construction requiring adjustment and/or relocation the necessary relocation work shall be accomplished by the respective utility company, as directed by the District Engineer. The State contractor shall coordinate any potential conflicts with utility companies and provide adequate notice prior to performing work.

Any adjustments and/or relocations of municipally owned sewer or water facilities shall be performed by the State's contractor in accordance with the respective agencies' standard specifications as directed by the District Engineer. The State contractor shall coordinate any potential conflicts with facility owners and provide adequate notice prior to performing work.

General Notes

1. **The Contractor's attention is directed to Section 105.09 Utilities, Delaware Standard Specifications, August 2001. The Contractor shall contact Miss Utility (1-800-282-8555) two working days prior to any excavation. The Contractor is responsible for the support and protection of all utilities when excavating. The Contractor is responsible for ensuring proper clearances, including safety clearances, from overhead utilities for construction equipment. The Contractor is advised to check the site for access purposes for his equipment and, if necessary, make arrangements directly with the utility companies for field adjustments for adequate clearances.**

2. **The information shown in the Contract Documents, including the Utility Statement and the Utility Schedule contained herein, concerning the location, type and size of existing and proposed utilities, their locations, and construction timing has been compiled by the preparer based on information furnished by each of the involved Utility Companies. It shall be the responsibility of the State's Contractor to verify all information and coordinate with the Utility Companies prior to and during construction, as specified in Section 105.09 of the Standard Specifications.**

3. **It is understood and agreed that the Contractor has considered in his bid all permanent and temporary utility appurtenances in their present and relocated positions as shown on the plans or described in the Utility Statement or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage due to any interference from the utility facilities and appurtenances or the operation of moving them, except that the Contractor may be granted an equitable extension of time.**

4. **Coordination and cooperation among the Utility Companies and the State's Contractor are of prime importance. Therefore, the Contractor is directed to contact the Utility Company representatives with any questions regarding this work prior to submitting bids and work schedules. Proposed work schedules should reflect the Utility Companies' proposed relocations. The Utility Companies do not work on weekends or legal holidays.**

Jim Bunting	**Del DOT Traffic**	**(302)760-4814**
Angel Collazo	**Delmarva Power Distribution**	**(302) 454-4370**
Matthew Parkhurst	**Delmarva Power, Transmission**	**(302) 454-4850**
Errol Hendricks	**G4S Technology LLC**	**(908)756-1181 ext.208**
David Clark	**New Castle County Sewer**	**(302) 395-5705**

5. **As outlined in Chapter 3 of the DelDOT Utilities Manual, individual utility companies are responsible for obtaining all required permits from municipal, State and federal government agencies and railroads. This includes but is not limited to**

water quality permits/DNREC Water Quality Certification, DNREC Subaqueous Lands/Wetlands permits, DNREC Coastal Zone Consistency Certification, County Floodplain permits (New Castle County only), U.S. Coast Guard permits, US Army Corps 404 permits, sediment and erosion permits, and railroad crossing permits.

6. **Individual utility companies are required to restore any areas disturbed in conjunction with their relocation work. If an area is disturbed by a utility company and is not properly restored, the Department may have the highway contractor perform the necessary restoration. Any additional costs incurred as a result will be forwarded to the utility company.**

DIVISION OF TRANSPORTATION SOLUTIONS

	13 Jan 2016
UTILITY COORDINATOR	**DATE**

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T201509002

F.A.P. NO. N/A for R/W

I-95/I-295/I-495 INTERSTATE HIGH MAST LIGHTING IMPROVEMENTS

NEW CASTLE COUNTY

Certificate of Right-of-Way Status – 100%

Level 1

As required by 23 CFR, Part 635, and other pertinent Federal and State regulations or laws, the following certifications are hereby made in reference to this highway project:

All project construction or work shall be performed within existing rights of way and permanent easements; and,

All necessary real property interests, including control of access rights when pertinent, were acquired as part of previous highway projects, and include legal and physical possession; and,

This project does not cause any persons to be displaced as defined in 49 CFR, Part 24; and,

The State has the right to remove, salvage, or demolish any improvements or personal property that may be located within project limits; and,

RIGHT OF WAY SECTION

Robert Cunningham
Chief, Right of Way

December 28, 2015

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

February 1, 2016

ENVIRONMENTAL REQUIREMENTS

FOR
State Contract No. T201509002
Federal Aid No.: ENHS-2015(27)

Contract Title: I-95, I-295, I-495 Interstate High Mast Lighting Improvements

In accordance with the procedural provisions for implementing the National Environmental Policy Act of 1969, as amended, the referenced project has been processed through the Department's Environmental Review Procedures and has been classified as a Level D/ Class II Action.

Due to the nature of the proposed construction activities, permits are not required for this project. However, the following construction requirements and special provisions have been developed to minimize and mitigate impact to the surrounding environs. These requirements by DelDOT not specified within the contract, but listed below, are the responsibility of the contractor and are subject to risk of shut down at the contractor's expense if not followed.

GENERAL REQUIREMENTS:

1. All construction debris, excavated material, brush, rocks, and refuse incidental to such work shall be placed either on shore above the influence of flood waters or on some suitable dumping ground.

2. That effort shall be made to keep construction debris from entering adjacent waterways or wetlands. Any debris that enters those areas shall be removed immediately.

3. The disposal of trees, brush, and other debris in any stream corridor, wetland, surface water, or drainage area is prohibited.

4. DelDOT Environmental Studies Section (302) 760-2264 must be notified if there are any changes to the project methods, footprint, materials, or designs, to allow the Department to coordinate with the appropriate resource agencies (COE, DNREC, and SHPO), for approval.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

RAILROAD STATEMENT
For

State Contract No.: T201509002

Federal Aid No.: ENHS-2015(27)

Project Title: I-95/I-295/I-495 Interstate High Mast Lighting Improvements

The following railroad companies maintain facilities within the contract limits:

- ☐ Amtrak
- ☐ CSX
- ☐ Delaware Coast Line
- ☐ East Penn
- ☐ Maryland & Delaware
- ☐ Norfolk Southern
- ☐ Wilmington & Western
- ☑ None

DOT Inventory No.: _____ No. Trains/Day:_____ Passenger Trains (Y / N):_____

In accordance with 23 CFR 635, herein is the railroad statement of coordination (check one):

☑ No Railroad involvement.

☐ Railroad Agreement unnecessary but railroad flagging required. The contractor shall follow requirements stated in the DelDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DelDOT's Railroad Program Manager at (302) 760-2183.

☐ Railroad Agreement required. The necessary railroad agreement, attached, is complete and fully executed. Railroad related work to be undertaken and completed as required for proper coordination with physical construction schedules. The Contractor shall follow requirements stated in the DelDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DelDOT's Railroad Program Manager at (302) 760-2183.

Approved As To Form:

Robert A. Perrine
DelDOT Railroad Program Manager

12/14/15
DATE

BID PROPOSAL FORMS

CONTRACT T201509002.01

FEDERAL AID PROJECT ENHS-2015(27)

CONTRACT ID: T201509002.01 PROJECT(S): ENHS-2015(27)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 HIGH MAST LIGHTING ITEMS					
0010	202573 TEST HOLES	8.000 EACH				
0020	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0030	211002 REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	66.000 LF				
0040	302007 GRADED AGGREGATE BASE COURSE, TYPE B	44.000 CY				
0050	401827 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22 (NON-CARBONATE STONE)	45.000 TON				
0060	602759 DRILLING FOR CONCRETE SHAFT (IN SOIL), 54" DIAMETER	504.000 LF				
0070	720050 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	407.000 LF				
0080	720586 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	2.000 EACH				
0090	726001 END ANCHORAGE 31	2.000 EACH				

CONTRACT ID: T201509002.01 PROJECT(S): ENHS-2015(27)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0100	743000 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
0110	743003 ARROWPANELS, TYPE C	125.000 EADY				
0120	743006 PLASTIC DRUMS	30360.000 EADY				
0130	743007 TRAFFIC OFFICERS	624.000 HOUR	75.00000		46800.00	
0140	743010 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	294.000 EADY				
0150	743024 TEMPORARY WARNING SIGNS AND PLAQUES	2569.000 EADY				
0160	744530 CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/ POLYMER LID-FRAME	75.000 EACH				
0170	744531 CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/ POLYMER LID-FRAME	12.000 EACH				
0180	744544 ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL	1.000 EACH				
0190	745602 FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)	3535.000 LF				

CONTRACT ID: T201509002.01 PROJECT(S): ENHS-2015(27)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0200	745604 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	27073.000 LF				
0210	745606 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)	140.000 LF				
0220	745609 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)	279.000 LF				
0230	746517 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE	12.000 EACH				
0240	746526 HIGH MAST LUMINAIRE (LED)	6.000 EACH				
0250	746563 LUMINAIRE (HPS), 1000 WATTS	76.000 EACH				
0260	746590 FURNISH & INSTALL GROUND ROD	24.000 EACH				
0270	746614 POLE BASE EXTENSION	4.000 CF				
0280	746625 ELECTRICAL MANHOLE	11.000 EACH				
0290	746626 HIGH MAST LIGHT POLE	20.000 EACH				

CONTRACT ID: T201509002.01 PROJECT(S): ENHS-2015(27)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0300	746627 FURNISH AND INSTALL 1-CONDUCTOR #2 AWG (15KV, ERP, MV-105) STRANDED COPPER	17233.000 LF				
0310	746852 POLE BASE, TYPE 6	12.000 EACH				
0320	746872 LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE	2.000 EACH				
0330	746901 UNDERPASS LUMINARE	6.000 EACH				
0340	746907 FURNISH & INSTALL 1-CONDUCTOR #2 AWG STRANDED COPPER	111260.000 LF				
0350	746908 FURNISH & INSTALL 1-CONDUCTOR #4 AWG STRANDED COPPER	15873.000 LF				
0360	746911 FURNISH & INSTALL 1-CONDUCTOR #10 AWG STRANDED COPPER	1271.000 LF				
0370	746919 FURNISH & INSTALL #4/0 AWG STRANDED COPPER	322.000 LF				
0380	746952 FURNISH AND INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT	LUMP	LUMP			
0390	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	1.000 EACH				
0400	908002 TOPSOIL (CY)	28.000 CY				
	SECTION 0001 TOTAL					
	TOTAL BID					

Contract No. T201509002.01

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 that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor 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 AND NOTARIZED

CERTIFICATION

Contract No. T201509002.01
Federal Aid Project No. ENHS-2015(27)

The undersigned bidder, _____

whose address is _____

and telephone number is _____ hereby certifies the following:

I/We have carefully examined the location of the proposed work, the proposed plans and specifications, and will be bound, upon award of this contract by the Department of Transportation, to execute in accordance with such award, a contract with necessary surety bond, of which contract this proposal and said plans and specifications shall be a part, to provide all necessary machinery, tools, labor and other means of construction, and to do all the work and to furnish all the materials necessary to perform and complete the said contract within the time and as required in accordance with the requirements of the Department of Transportation, and at the unit prices for the various items as listed on the preceding pages.

Bidder's Certification Statement [US DOT Suspension and Debarment Regulation (49 CFR 29)]:

NOTICE: All contractors who hold prime contracts (Federal Aid) with DelDOT are advised that the prime contractor and subcontractors are required to submit to DelDOT a signed and notary attested copy of the Bidder Certification Statement for each and every subcontract that will be utilized by the prime contractor. This Certification **must** be filed with DelDOT prior to written approval being granted for each and every subcontractor. Copies of the Certification Form are available from the appropriate District Construction Office.

Under penalty of perjury under the laws of the United States, that I/We, or any person associated therewith in the capacity of (owner, partner, director, officer, principal, investigator, project director, manager, auditor, or any position involving the administration federal funds):

a. am/are not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;
b. have not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;
c. do not have a proposed debarment pending; and,
d. have not been indicted, convicted, or had a civil judgement rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted, indicate below to whom it applies, initiating agency, and dates of action. Providing false information may result in criminal prosection or administrative sanctions.

_____

_____

_____

(Insert Exceptions)

DBE Program Assurance:

NOTICE: In accordance with 49 CFR Part 26 the undersigned, a legally authorized representative of the bidder listed below, must complete this assurance.

By its signature affixed hereto, assures the Department that it will attain DBE participation as indicated:

Disadvantaged Business Enterprise _____ percent (blank to be filled in by bidder)

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

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

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

By submission of this proposal, each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

==========

I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No. Date No. Date No. Date No. Date No. Date

_____ _____ _____ _____ _____

BIDDERS MUST ACKNOWLEDGE RECEIPT OF ALL ADDENDA

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____

==========

Sealed and dated this _____ day of _____ in the year of our Lord two thousand _____ (20___).

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

SWORN TO AND SUBSCRIBED BEFORE ME this ___ day of _____, 20____.

Notary Seal

_____
Notary

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That:_____

of_____ in the County of _____and State of _____ as **Principal**, and _____ of _____ in the County of _____ and State of _____ as **Surety**, legally authorized to do business in the State of Delaware ("**State**"), are held and firmly unto the **State** in the sum of _____ _____Dollars ($_____), or _____ percent not to exceed _____ _____ Dollars ($_____) of amount of bid on Contract No. T201509002.01 , 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