# SPECIAL PROVISIONS

## ROUTE 70 BRIDGE OVER MANASQUAN RIVER
## FROM HERBERTSVILLE ROAD TO RIVERVIEW DRIVE
## CONTRACT NO. 058980109
## WIDENING, RECONSTRUCTION & STRUCTURES
## TOWNSHIP OF BRICK AND BOROUGH OF POINT PLEASANT,
## OCEAN COUNTY AND
## TOWNSHIP OF WALL AND BOROUGH OF BRIELLE,
## MONMOUTH COUNTY
## FEDERAL PROJECT NUMBER BRF-0018(149)

### AUTHORIZATION OF CONTRACT

The Contract for this Project is authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements thereto, and Title 23 of the United States Code - Highways.

### SPECIFICATIONS TO BE USED

The 2001 U.S. Customary English Standard Specifications for Road and Bridge Construction, of the New Jersey Department of Transportation as amended herein will govern the construction of this Project and the execution of the Contract.

These Special Provisions consist of the following:

Pages 1 to 243 inclusive for General, Road, and Bridge Provisions.

Required Contract Provisions, Federal-Aid Construction Contracts (Form FHWA-1273) pages 1 to 10 inclusive, revised March 1994.

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246), pages 1 to 5 inclusive, dated December 1980, revised April 1984.

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246), pages 1 and 2, dated December 1980, revised April 1984.

State of New Jersey Equal Employment Opportunity for Contracts Funded by FHWA, page 1, dated November 1978, revised April 1984.

Emerging Small Business Enterprise Utilization Attachment, FHWA Funded Contracts, pages 1 to 7 inclusive, dated March 2001.

Equal Employment Opportunity Special Provisions, pages 1 to 11 inclusive, dated February 1976, revised April 1984, November 22, 1988, and March 1998.

Special Contract Provisions for Investigating, Reporting, and Resolving Employment Discrimination and Sexual Harassment Complaints, pages 1 and 2 inclusive, dated January 1989.

General wage determinations issued under Davis-Bacon and related acts, published by US Department of Labor, may be obtained from the Davis-Bacon web site at http://www.access.gpo.gov/davisbacon/nj.html under the appropriate county, select the construction type heading: HIGHWAY.

The Contractor shall pay the minimum wage rates determined by the United States Secretary of Labor and the New Jersey Department of Labor. If the minimum wage rate prescribed for any craft by the United States Secretary of Labor is not the same as the minimum wage rate prescribed for that craft by the New Jersey Department of Labor, the higher rate shall be the rate paid.

State wage rates may be obtained from the New Jersey Department of Labor (Telephone: 609-292-2259) or by accessing the Department of Labor's web site at http://www.nj.gov/labor/lsse/lspubcon.html The State wage rates in effect at the time of award will be made a part of this Contract, pursuant to Chapter 150, Laws of 1963 (NJSA 34:11-56.25, *et seq.*).

In the event it is found that any employee of the Contractor or any subcontractor covered by the Contract, has been paid a rate of wages less than the minimum wage required to be paid by the Contract, the State may terminate the Contractor's or subcontractor's right to proceed with the Work, or such part of the Work, as to which there has been a failure to pay required wages and to prosecute the Work to completion or otherwise. The Contractor and its sureties shall be liable to the State for any excess costs occasioned thereby.

# DIVISION 100 - GENERAL PROVISIONS

## SECTION 101 - GENERAL INFORMATION

**101.01 General.**
THE FOLLOWING IS ADDED:

Pursuant to NJSA 27:1B-21.6, the Commissioner intends to enter into a multi-year contract for the advancement of the Project. Although the multi-year contract will pledge funds anticipated to be appropriated for the Project by the Legislature, payment of the moneys pledged is subject to the availability of funds in the fiscal year (FY) in which the funds are to be appropriated. Only amounts appropriated by law may be expended.

The Commissioner intends to proceed expeditiously with the Project. However, there is no assurance that the Annual Appropriations Act will contain an appropriation or that the Federal Government will approve or provide federal funding for the Project. The Legislature has no legal obligation to make such an appropriation. Failure by the Legislature to appropriate funds or failure by the Federal Government to approve or provide federal funding sufficient to advance the Project will not constitute a default under, or breach of, any contract entered into by the State for the construction of the Project. However, if the State terminates the Contract or suspends work under the Contract because the Legislature has failed to appropriate or the Federal Government has failed to provide or approve sufficient funding to advance the Project, the parties to the Contract will retain their rights pursuant to the suspension of work and termination of Contract Provisions of the Project specifications; except as indicated below.

The Contractor shall not expend or cause to be expended any sum in excess of the amount allocated in the current fiscal year's Capital Program (as specified below). The Department will notify the Contractor when each level of additional funding has been appropriated by the Legislature or approved or provided by the Federal Government. Any expenditure by the contractor which exceeds the amount actually appropriated or exceeds the amount of approved federal funding is at the Contractor's risk and the Contractor waives any right to recover any sum in excess of that appropriated amount or the amount approved or provided by the Federal Government even if the State terminates or suspends work under the Contract because the Legislature has failed to appropriate or the Federal Government has not provided or approved sufficient funds to advance the Project.

The approved FY2005 Capital Program has an item with $18,812,173.00 for the construction of the Project.

It is anticipated that $21,300,640.00 dollars in additional funds will be provided during Federal FY 2006.

**101.03 Terms.**
THE FIRST SENTENCE IS CHANGED TO:

When the following terms are used in the Contract Documents, the intent and meaning shall be strictly construed as follows:

THE FOLLOWING TERMS ARE ADDED:

ADDITIONAL COMPENSATION. A monetary payment(s), sought by the Contractor, premised upon (1.) an adjustment or modification to the Contract pay item(s) for particular work or (2.) any or all forms of compensation over and above that which is specifically provided under the various individual Contract Pay Items or Contract payment provisions.

BID: The term “Bid” means the offer of a bidder, properly signed and guaranteed, on the prepared form furnished by the Department, or printed from the Computer Disk, to perform the Work at the prices therein.

COMPLETION OF THE CONTRACT. The event termed “Completion of the Contract”, under the Specifications and the Contractual Liability Act NJSA 59:13-1 *et seq.,* shall be deemed to have occurred as of the date the Contractor accepts or accepts with reservation of specific claims, in writing in accord with forms supplied by the Department, the Final Certificate issued by the Department or the 31st day after issuance of said Final Certificate by the Department, whichever event may be the first to occur.

CLAIM. The Contractor has reason to believe it is entitled to additional compensation and/or an extension of contract time, in accordance with and subject to the Contract Documents and the provisions of the Contractual Liability Act, N.J.S.A. 59:13-1 *et seq*., arising out of or relating to the happening of an event, thing or

occurrence or an act or failure to act by the Engineer. A claim accrues when it arises, meaning when a situation or occurrence takes place or comes about which has or possesses the potential to support or become the basis for additional compensation and/or an extension of time.

DISPUTE (AS TO A CLAIM). A disagreement between the Department and the Contractor with regard to the Work or Contract Documents arising out of a claim by the Contractor for additional compensation or an extension of time.

FINAL CERTIFICATE. It is the final payment document that sets forth the total amount payable to the Contractor, including therein an itemization of said amount segregated as to Pay Item quantities, Extra Work, and any other basis for payment; it also includes therein any retainage to be released and all deductions made or to be made from prior payments as required pursuant to the provisions of the Contract Documents, which may result in either a Final Payment to the Contractor or a Credit (payment) due the Department.

NON-BINDING MEDIATION. The fourth and final step in the Department's Contractual Claim Resolution Process for claims arising under the Contract utilizing a non-binding mediation forum wherein an independent mediator is engaged in an attempt to resolve a claim presented by a Contractor.

PARCEL. Property to be acquired for transportation purposes, described by metes and bounds.

SECRETARY, DEPARTMENT CLAIMS COMMITTEE. The individual employed by the Department who gathers information and provides administrative assistance to the members of the Department Claims Committee. This individual is the conduit between the Department Claims Committee members and the Contractor. Contact by the Contractor regarding any issue involving the Claims Committee or Mediation shall be through the Secretary.

THE FOLLOWING TERMS ARE CHANGED:

THE THIRD ITEM LISTED UNDER THE TERM "COMPLETION" IS CHANGED TO:

3. the Contractor has satisfactorily executed and delivered to the Engineer all documents, which is to include the federal form FHWA-47 "Contractor's Statement of Materials and Labor" according to 23CFR 635, for Federal Funded Projects, certifications, and proofs of compliance required by the Contract Documents, it being understood that the satisfactory execution and delivery of said documents, certificates, and proofs of compliance is a requirement of the Contract.

ADDENDA (Addenda or Addendum used interchangeably). The term "Addenda" means the written, graphic, or electronic information issued before the opening of bids that clarify, correct, or change the Contract Documents.

COMPUTER DISK. The term "Computer Disk" means a diskette or CD-ROM that contains Expedite software Electronic Bidding System (EBS) file. This Computer Disk will produce a Proposal Form. The Computer Disk shall be used to prepare and print the Proposal Form.

The following is a listing of the microcomputer system equipment necessary to properly run the EBS program:

1. Personal computer with at least a 2.5 GHz processor.
2. Floppy diskette drive or CD-ROM optical drive
3. 512-MB RAM
4. 10 GB available hard disk space
5. Microsoft Windows XP or Windows 2000 operating system
6. Laser Jet or Ink Jet printer

The Department assumes no responsibility for the use of the Computer Disk. The Department will not be liable for any losses, damages, or problems that may arise from the use of the Computer Disk by the Contractor, even if such problems result in the rejection of the Contractor's bid. The Department will not be responsible for any bid item spreadsheet program on the Computer Disk that is not compatible with the Contractor's computer equipment or software. All liability for any damages caused by the use of the Computer Disk shall be borne by the Contractor. The ultimate responsibility for the accuracy of the Contractor's bid

remains with the Contractor. Furthermore, the Department will not be held responsible for the loss of or damage to any Computer Disk after the Contractor takes possession of it or it is mailed to the Contractor. If any Computer Disk is lost or damaged, the Contractor may purchase another Computer Disk.

DESIGN UNIT. The term "Design Unit" means the Department's consultant engineering firm, the in-house design unit(s), or both that prepared the Contract Documents for a project. The design unit(s) for any particular project shall be as designated by letter to the awarded Contractor.

DEPARTMENT CLAIMS COMMITTEE. A contractual body available to review and resolve claims that arise under the Contract. The Committee consists of three voting members with the Director of Design Services as the chairperson, one member is the Department's Chief Financial Office, and one member is selected from the other directors within Capital Program Management. Additional non-voting members are a Deputy Attorney General, the Secretary of the Department Claims Committee, and a member of the Federal Highway Administration (for federally funded projects).

EXTREME WEATHER CONDITIONS. When, solely as a result of adverse weather, the Contractor is not able to work, the Contractor is entitled to claim that progress of the Work has been affected by extreme weather conditions and may seek an extension of Contract Time consistent with the provisions of Subsection 108.11.

HOT MIX ASPHALT (HMA) PAVEMENT. The combination of base course, intermediate course, and surface course of hot mix asphalt.

ON-DUTY POLICE. The term "on-duty" with regard to municipal police shall mean that the work of providing traffic safety services shall be an extension of regular employment for, and sanctioned by, the municipality, even if it is on an overtime pay rate basis. The municipal police, while so working, shall be covered by the municipality's liability insurance coverage; and must have successfully completed a traffic safety program approved by the Department.

PAVEMENT STRUCTURE. The combination of surface, intermediate and base courses, and when specified, a subbase course, placed on a subgrade to support the traffic load and distribute it to the roadbed (see Figure 101-1). These various courses are defined as follows:

1. *Surface Course*. One or more layers of specified material of designed thickness at the top of the pavement structure.
2. *Intermediate Course*. One or more layers of specified material of designed thickness placed on the base course.
3. *Base Course*. One or more layers of specified material of designed thickness placed on the subgrade or subbase.
4. *Subbase*. One or more layers of specified material of designed thickness placed on the subgrade.

PLANS. The approved plans, profiles, typical sections, cross-sections, approved working drawings, and supplemental drawings, or exact reproductions thereof, which show the location, character, dimensions, quantities, and details of the Work to be done. This includes the latest version of all Standard Construction Details in effect at the time of Advertisement. Certified working drawings are not plans and not part of the Contract Documents.

REGIONAL DISPUTE BOARD. A three-member Board, comprised of one member from the Division of Project Management, one member from the Bureau of Construction Engineering, and the Regional Construction Engineer (Chairperson), that is available under the terms of the Contract to review Disputes which have not been resolved by the Resident Engineer.

REMEDIATE. The term "remediate" means the process that is approved by the New Jersey Department of Environmental Protection to address all regulated discharges.

SPECIFICATIONS. The compilation of provisions and requirements for the performance of prescribed work contained in the Standard Specifications, as supplemented by the Supplemental Specifications and Special Provisions, and modified by Addenda which, before the receipt of bids, are transmitted to prospective Bidders.

1. *Standard Specifications.* The term "Standard Specifications" means the 2001 Standard Specifications for Road and Bridge Construction of the New Jersey Department of Transportation, which has been approved for general application and repetitive use.
2. *Supplemental Specifications.* Approved additions and revisions to the Standard Specifications.
3. *Special Provisions.* Revisions to the Standard and Supplemental Specifications applicable to an individual project.
4. *Electrical Materials Specifications.* Approved standards for electrical materials, equipment, and installations that are in addition to the above specifications.

SUBSTANTIAL COMPLETION. The term "Substantial Completion" means the point at which the performance of all Work on the Project has been completed except landscaping items (including the planting of trees, shrubs, vines, ground covers, and seedlings), final cleanup, and repair of unacceptable work, and provided the Engineer has solely determined that:

1. the Project is safe and convenient for use by the public, and
2. failure to complete the Work and repairs excepted above does not result in the deterioration of other completed Work; and provided further, that the value of landscaping work remaining to be performed, repairs, and cleanup is less than two percent of the Total Adjusted Contract Price.

THE FOLLOWING TERMS ARE DELETED:

CLAIMS REVIEW BOARD

DISPUTE

**101.04 Inquiries Regarding the Project.**

Inquiries regarding the various types of work of this Contract shall be directed to the following representatives of the Department having offices at P.O. Box 600, Trenton, New Jersey 08625, or such other individuals as may hereafter be designated:

**1. Before Award of the Contract.** All inquiries shall be directed to the Bureau of Quality Assurance at P.O. Box 600, Trenton, New Jersey 08625.

Telephone: 609-530-3810 (Eric Hewitson)

Fax: 609-530-3853

All inquiries shall include the following:

a. Name of the company;
b. Telephone number, fax number, and contact person; and
c. Specifics of the inquiry, including anticipated impacts.

The Department will investigate the information provided in the inquiry and then respond through an addendum only if determined to be necessary.

**2. After Award of the Contract.** All inquiries shall be directed to the Resident Engineer through the following Regional Construction Office:

Central
Mr. Thomas J. Dowd, Regional Construction Engineer
100 Daniels Way
Freehold, NJ 07728
Telephone: 732-308-4074

## SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS

THE ENTIRE SECTION IS CHANGED TO:

**102.01 Prequalification of Prospective Bidders.**

Bids will be received only from Bidders who, before the delivery of the bid, have been prequalified according to Regulations Covering the Classification of Prospective Bidders issued according to NJSA 27:7-35.1 *et seq.* and who at the time of delivery of bid have effective prequalification ratings of not less than the amounts of their respective bids.

Additionally, for wholly State-funded contracts, bidders must be registered with the New Jersey Department of Labor, Division of Wage and Hour Compliance, at the time of bid pursuant to the "Public Works Contractor Registration Act," N.J.S.A. 34:11-56.48 et seq. (P.L. 2003, c. 91). This requirement for registration at the time of bid does not apply to FHWA funded projects.

**102.02 Disqualification of Prequalified Prospective Bidders.**

The Department reserves the right to disqualify or refuse to receive a bid from a prospective Bidder even though prequalified as required by Subsection 102.01 for any of the following reasons:

1. Lack of competency or lack of adequate machinery, plant, or other equipment.
2. Uncompleted work that, in the judgment of the Department, might hinder or prevent the prompt completion of additional work, if awarded.
3. Failure to pay, or satisfactorily settle, all bills due for labor, equipment, or material on previous Contracts.
4. Failure to comply with any prequalification regulations of the Department.
5. Default under any previous contract.
6. Unsatisfactory performance on previous or current contracts.
7. Questionable moral integrity as determined by the Attorney General of New Jersey or the Commissioner.
8. Failure to reimburse the State for monies owed on any previously awarded contracts including those where the prospective Bidder is a party to a joint venture and the joint venture has failed to reimburse the State for monies owed.
9. Documented failure to comply with the conditions of permits
10. For wholly State-funded contracts, failure to have valid, current registration with the New Jersey Department of Labor, Division of Wage and Hour Compliance according to N.J.S.A. 34:11-56.48 et seq., at the time of bid.

**102.03 Bidder Registration and Downloading of the Bid Documents; Contents of the Bid.**

This project is being bid by use of an electronic bidding process. Electronic bidding information is available on Bid Express at www.bidx.com. Registration and a subscription fee are required to access the bid documents and plans. Once the bidder has registered, log on using the log on ID and password provided to you by Bid Express. Select New Jersey by either clicking "NJ" on the map or using the drop down list. The bidder must then download the Expedite bidding software. When installing the bid program the Bidder enters their Vendor code assigned by NJDOT. Before running the electronic bidding program, the Bidder shall read the on-line help documentation for the Expedite Software.

All bid documents with the exception of the Power of Attorney for the Proposal Bond shall be downloaded from the NJDOT Bid Express web site. A bid shall consist of the downloaded and properly completed proposal form, proposal bond, and financial statement plus the Power of Attorney for the Proposal Bond all of which shall be submitted to the Department on or before the time for the opening of bids.

The Proposal Form states the location and description of the Project, shows the approximate estimate of the various quantities and kinds of Work to be performed, and includes a schedule of Pay Items for which bid prices are invited. The Proposal Form and accompanying Special Provisions state the number of days or date in which the Project must be completed, the amount of the Proposal Bond, and the date, time, and place of the opening of Proposals. The financial statement provides current information regarding the bidder's financial condition. The Proposal Bond guarantees execution of the contract by the bidder receiving the award. Other Contract Documents are considered part o f the proposal whether attached or not.

The bidder is required to submit both a paper bid which is produced from the Expedite software as well as an electronic copy which shall be on diskette or CD-ROM. No alteration to that software is permitted. The paper bid submitted to the Department will be reviewed and evaluated by the Department and serve as the basis for the award and subsequent contract. In case of discrepancies between the paper bid and the electronic copy, the paper bid shall govern.

If you experience any problems with the web site, downloading documents or the Expedite software contact:

Joseph Weber
NJDOT
TRNS*PORT Project Manager
609-530-2469

**102.04 Interpretation of Quantities in Proposal Form.**

The quantities appearing in the bid schedule are approximate only and are prepared for the comparison of bids. Payment will be made only for the quantities of Work completed according to the Contract. Such payment will be made at the original unit prices for the quantities of Work accepted by the Engineer. The scheduled quantities of Work may be increased or decreased, or Pay Items may be eliminated in their entirety as hereinafter provided.

**102.05 "If and Where Directed" Items.**

The Proposal Form may request bids on one or more Pay Items to be incorporated into the Project "if and where directed" by the Engineer. Such items may not be located on the Plans. The estimated quantities set out in the Proposal Form for such items are presented solely for the purpose of obtaining a representative bid price, but are not intended to indicate the Department's anticipation as to the quantities of such items which are to be actually incorporated into the Project. Depending on field conditions, such "if and where directed" items may or may not be incorporated into the Project and if incorporated may be many times the estimated quantity or only a fraction thereof.

Incorporation of such items shall only be made on written directions of the Engineer. In the absence of written directions, no such items shall be incorporated into the Project and if incorporated will not be paid for. The Engineer may order incorporation of such items at any location within the Project and at any time during the Contract Time. Claims for additional compensation shall not be made because of any increase, decrease, or elimination of such items, nor because of an increase or decrease in the amount of Work due to the field conditions encountered in incorporating such items into the Project.

**102.06 Examination of Contract Documents and Site of Project.**

The Bidder shall examine carefully the site of the proposed Project, the Contract Documents, and other information before submitting a Proposal. The Contract Documents are not to be construed as an averred representation or warranty of the existing conditions. In the event the Bidder's examination reveals that the site conditions are inconsistent with the Contract Documents or there are discrepancies, errors, omissions or patent ambiguities within the Contract Documents, the Bidder shall immediately notify the Department as provided in Subsection 101.04. Bidders shall make such independent investigation and examination as necessary to satisfy the Bidder as to the conditions to be encountered in the performance of the Work and the type of equipment and operations required to perform the Work. The Bidder shall investigate, with respect to possible local material sources, the quality and quantity of material available and the type and extent of processing that may be required to produce material conforming to the requirements of the Contract Documents. The submission of a Proposal shall be considered prima facie evidence that the Bidder has made such independent investigation and examination, including the information provided below, and is fully aware of the requirements of the Contract Documents, including all restrictions. Further, the Bidder warrants that the proposed contract prices in the Proposal include all costs to complete the Work.

The Bidders must provide written notice to the Regional Construction Engineer as listed in the Special Provisions Subsection 101.04, at least 24 hours in advance of any investigation at the site, and insure any staff at the site have two forms of identification and the site authorization form received with the purchase of the Contract Documents.

What is specified below is not a part of the Contract and is made available for information only. The Department makes no representation, warranty or guarantee, expressed or implied, by making available such information. It is also the Bidder's responsibility to access such information.**1. Investigation of Subsurface and Surface Conditions.**

The records of the Department's subsurface investigation, including, but not limited to, boring logs and Geotechnical Engineering Design Reports, may be inspected at or ordered through the Department's plan file room, 1035 Parkway Avenue, P.O. Box 600, Trenton, New Jersey 08625. This investigation,

while considered by the Department to be sufficient for design purposes, may not be a sufficient substitute for the Bidder's own investigation, interpretation, or judgement in preparing a Proposal for construction purposes. The Bidder shall not rely on any estimates and quantities included in these investigations. The conditions indicated by such investigations or records thereof, and as shown by the cross-sections in the Plans, may not be representative of those existing throughout such areas, or that materials other than, or in proportions different from those indicated, may be encountered.

The soil and rock descriptions shown on the boring logs are determined by a visual inspection of samples from the various explorations unless otherwise noted. These samples may be available for nondestructive examination. The observed water levels and other water conditions indicated on the boring logs are as recorded at the time of the exploration. These levels and other conditions may vary considerably, with time, according to the prevailing climate, rainfall, and other factors. If a generalized soil profile is described in the text it is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples.

The Bidder is charged with knowledge of the State's physical geography, and in performing its site investigation shall be fully aware of the following publications and such others as may be listed in the Special Provisions:

a. Bulletin 50, Geologic Series, "The Geology of New Jersey" by H. Kummel, out of print, available generally as library reference material.
b. Geologic Maps of New Jersey, available through NJDEP.
c. Engineering Soils Survey of New Jersey, available through the Bureau of Research, College of Engineering, Rutgers University, New Brunswick, New Jersey 08903.
d. Soil Surveys of Individual Counties prepared by the US Department of Agriculture, Soil Conservation Service, in cooperation with the New Jersey Agricultural Experiment Station and Cook College, Rutgers University, available through local Soil Conservation District Offices.

Pavement core record are for the Contractor's information only. This investigation, while considered by the Department to be sufficient for design purposes, may not be a sufficient substitute for the Bidder's own investigation, interpretation, or judgment in preparing a Proposal. The conditions indicated by such investigation may not be representative of those existing throughout such areas, or those materials other than, or in proportions different from those indicated, may be encountered. The Bidder shall not solely rely on any information included in this investigation.

## NEW JERSEY DEPARTMENT OF TRANSPORTATION
## PAVEMENT CORE RECORD

PROJECT/ROUTE & SECTION: ROUTE 70 OVER MANASQUAN RIVER

DRILLER: WARREN GEORGE, INC

INSPECTOR: VASU GANARAJAN & KURT GEIGER OF ARORA & ASSOCIATES, P.C

COUNTY/TOWNSHIP: BRICK TOWNSHIP, OCEAN COUNTY AND WALL TOWNSHIP, MONMOUTH COUNTY

DATE STARTED: 01/21/2004 DATE COMPLETED: 02/04/2004

| CORE NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| ROUTE | 70 | 70 | 70 | 70 |
| DIRECTION (N, E, S, W) | W | W | W | E |
| MILE POST (MP or Station) | 59+50 | 59+50 | 59+50 | 66+50 |
| LANE NO. (Left to Right) | 1 | 2 | - | 2 |
| SHOULDER (Inside or Outside) | - | - | Out side | - |
| CORE DIAMETER (Inches) | 4 | 4 | 4 | 4 |
| TOTAL CORE DEPTH (Inches) | 8 | 8 | 11 | 6.5 |
| CORE DRILLED TO | Sub-grade | Sub-grade | Sub-grade | Sub-grade |
| SURFACE TYPE (AC/PC) | AC | AC | AC | AC |
| AC THICKNESS (Inches) | 8 | 8 | 11 | 6.5 |
| PC THICKNESS (Inches) | - | - | - | - |

* Lane 1 is the left lane in the direction of travel.

| CORE NUMBER | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| ROUTE | 70 | 70 | 70 | 70 |
| DIRECTION<br>(N, E, S, W) | E | E | E | W |
| MILE POST<br>(MP or Station) | 66+70 | 94+00 | 94+00 | 101+50 |
| LANE NO.<br>(Left to Right) | - | 2 | 1 | 1 |
| SHOULDER<br>(Inside or Outside) | Out side | - | - | - |
| CORE DIAMETER<br>(Inches) | 4 | 4 | 4 | 4 |
| TOTAL CORE DEPTH<br>(Inches) | 12 | 19 | 19 | 12.5 |
| CORE DRILLED TO | Sub-grade | Sub-grade | Sub-grade | Sub-grade |
| SURFACE TYPE<br>(AC/PC) | AC | AC | AC | AC |
| AC THICKNESS<br>(Inches) | 12 | 10 | 14 | 12.5 |
| PC THICKNESS<br>(Inches) | - | 9 | 5 | - |

* Lane 1 is the left lane in the direction of travel.

| CORE NUMBER | 9 | 10 | 11 | 12 |
|---|---|---|---|---|
| ROUTE | 70 | 70 | River Road | River Road |
| DIRECTION (N, E, S, W) | W | W | N | N |
| MILE POST (MP or Station) | 101+50 | 101+50 | 8+00 | 8+60 |
| LANE NO. (Left to Right) | 2 | - | 2 | 1 |
| SHOULDER (Inside or Outside) | - | Out side | - | - |
| CORE DIAMETER (Inches) | 4 | 4 | 4 | 4 |
| TOTAL CORE DEPTH (Inches) | 12.5 | 12 | 7 | 3.5 |
| CORE DRILLED TO | Sub-grade | Sub-grade | Sub-grade | Sub-grade |
| SURFACE TYPE (AC/PC) | AC | AC | AC | AC |
| AC THICKNESS (Inches) | 12.5 | 12 | 7 | 3.5 |
| PC THICKNESS (Inches) | - | - | - | - |

* Lane 1 is the left lane in the direction of travel.

| CORE NUMBER | 13 | 14 | 15 | 16 |
|---|---|---|---|---|
| ROUTE | Riviera Drive | Riviera Drive | Main Avenue | Main Avenue |
| DIRECTION (N, E, S, W) | S | S | E | W |
| MILE POST (MP or Station) | 10+95 | 11+80 | 117+80 | 118+90 |
| LANE NO. (Left to Right) | 1 | 2 | 1 | 1 |
| SHOULDER (Inside or Outside) | - | - | - | - |
| CORE DIAMETER (Inches) | 4 | 4 | 4 | 4 |
| TOTAL CORE DEPTH (Inches) | 10 | 11 | 6 | 5.5 |
| CORE DRILLED TO | Sub-grade | Sub-grade | Sub-grade | Sub-grade |
| SURFACE TYPE (AC/PC) | AC | AC | AC | AC |
| AC THICKNESS (Inches) | 10 | 11 | 6 | 5.5 |
| PC THICKNESS (Inches) | - | - | - | - |

* Lane 1 is the left lane in the direction of travel.

The pavement information shown herein was obtained for State design and estimate purposes. It is made available to the authorized users only that they may have access to the same information available to the State. It is presented in good faith, but is not intended as a substitute for investigations, interpretation or judgment of such authorized users.

2. **Utility Agreements.** In addition to what is provided under Subsection 105.09, the Utility agreements, modifications, and orders relating to the Project may be inspected at or ordered through the Department's plan file room, 1035 Parkway Avenue, P.O. Box 600, Trenton, New Jersey 08625. Existing information and proposed construction documents shall be obtained through the utility owners for their respective work.
3. **Existing Plans and As-builts.** As-built plans of Department owned facilities may be inspected at the Department's plan file room or copies ordered upon written request through the Engineering Documents Unit, New Jersey Department of Transportation, 1035 Parkway Avenue, P.O. Box 600, Trenton, New Jersey 08625. Contour maps may be available for some Projects and the Bidders may inspect such maps or obtain copies for their use upon written request to the Engineering Documents Unit. Plans of Municipal owned or County owned facilities shall be obtained through the Municipality or County. Any information obtained from the existing documents shall be verified by the Bidder in regards to its application for bidding and completing the Project. A list of existing structures within the Project will be provided on the Plans. The existing plans and as-builts used in the development of Contract Documents will be listed.
   Existing Plans and As-builts used are as follows:
   a. Concrete Pile Repairs at Manasquan River Bridge, Route 34 (1927) Route 70 (1953) Section 6, April, 1956
   b. Manasquan River Bridge, Route 34 (1927) Section 6 dated November, 1935

4. **Permits.** In addition to the permit information provided in the Contract Documents, the full permits relating to the Project may be inspected at or ordered through the Department's plan file room, 1035 Parkway Avenue, P.O. Box 600, Trenton, New Jersey 08625.

**102.07 Preparation of the Proposal.**

The Bidder shall submit a Proposal produced from the Expedite software that was downloaded from the NJDOT Bid Express web site. The Proposal shall include all addenda which shall also be downloaded from that web site. . The Bidder shall specify a price in figures for each Pay Item. For lump sum items, the price should appear solely in the box provided for the lump sum item under the column designated as "Amounts." For unit price items the per unit price shall appear under the column designated "Unit Price" in the appropriate box, and the product of the respective unit price and the approximate quantity for that item shall appear under the column designated "Amounts." The Total Contract Price is the sum of all figures shown in the column designated "Amounts" and shall appear at the location provided therefore. When the Bidder intends to bid zero ($0.00) for a Pay Item, a "0" should appear in the "Unit Price" and "Amounts" columns for unit price items or in the "Amounts" column for lump sum items.

When the Proposal contains alternate items, the Bidder shall only provide the unit price and amount for the lowest priced alternate item. When alternate items in the proposal have a lump sum pay quantity, the Bidder shall only provide the amount for the lowest priced alternate item. The alternate item for which a price has been provided shall be constructed. When the proposal contains alternate groups of items, the Bidder shall only provide the unit price and amount for each item within the lowest priced alternate group. The alternate group of items for which a price has been provided shall be constructed.

The only entries permitted in the proposal produced using the Expedite software will be the unit or lump sum prices for items that must be bid. The Expedite software will perform all extensions of the unit or lump sum prices, calculate the total bid amounts, and print a completed Proposal Form.

The Proposal Form printed from the Expedite software shall be printed on 8 ½" x 11" white papers and shall include all revisions to the proposal included in the latest addendum issued by the Department. Bids will be accepted only if submitted on the Proposal Form generated and printed from Expedite software.

The Bidder shall check its bid prior to submission using the Expedite software. The Bidder shall select "tools" and then select "check bid" and assure there are no errors prior to printing the electronic bid. After final printing, the Bidder may make changes to the bid by indicating the changes in ink and initialing prior to submitting the bid. Once the Bidder has completed the bid and made all desired changes, the paper bid with original signatures and an electronic copy on a diskette or CD-ROM shall be submitted to the Department. In the event of a discrepancy between the electronic copy and the paper bid, the paper bid will govern. The electronic copy on diskette or CD Rom shall be submitted in a separate envelope from the paper bid. The envelopes containing the paper bid and electronic copy shall each include the bidder's name and the DP number of the electronic bid submitted.

The paper bid must be signed in ink by the Bidder. If the Bidder is an individual, the Bidder's name and post office address must be shown; by a partnership, the name and post office address of each partnership member must be shown; as a joint venture, the name and post office address of each member or officer of the firms represented by the joint venture must be shown; by a corporation, the name of the corporation and the business address of its corporate offices must be shown. For bids submitted by Joint Ventures the bidder shall select "tools" from the Expedite menu and mark the electronic bid as "Joint Bid."

**102.08 Balanced Bids.**

Each Pay Item should reflect the actual cost, which the Bidder anticipates incurring for the performance of that particular item, together with a proportional share of the Bidder's anticipated profit, overhead, and costs to perform work for which no Pay Item is provided. In no event will the Department consider any claim for additional compensation arising from the bid on an item, or group of items, inaccurately reflecting a disproportionate share of the Bidder's anticipated profit, overhead, and other costs.

**102.09 Delivery of Bids.**

Each bid should be in delivered in 2 envelopes one containing the paper bid and related documents the other electronic copy on either a diskette or CD ROM Each envelope shall clearly indicate its contents. The bid shall be mailed or hand carried to the Department at the address and in care of the official in whose office the bids are to be received. Bids must be received before or at the time and at the place specified in the Advertisement. Bids will not be accepted after the receipt of bids has been declared closed by the Presiding Officer.

When the Bidder submits bids for two or more Projects, a single updated financial questionnaire, submitted in a separate envelope, is acceptable instead of a separate questionnaire for each Project.

**102.10 Proposal Bond.**

The bid, when submitted, shall be accompanied by a Proposal Bond satisfactory to the Commissioner, on the form furnished by the Department, for a sum of not less than 50 percent of the Total Contract Price. Proposal bonds which do not comply in all respects with the provisions of N.J.A.C. 16:44-5.1 (d) are not satisfactory to the Commissioner and will not be accepted.

The Proposal Bond shall be properly filled out, signed, and witnessed, and shall be furnished only by such surety company or companies authorized to do business in this State as are listed in the current US Treasury Department Circular 570 as of the date for receipt of bids for the particular Project.

The Proposal Bond shall be accompanied by a copy of the power of attorney executed by the surety company or companies. The power of attorney shall set forth the authority of the attorney-in-fact who has signed the bond on behalf of the surety company to bind the company and shall further certify that such power is in full force and effect as of the date of the bond.

**102.11 Withdrawal of Bids.**

A Bidder may withdraw a Bid after it has been submitted to the Department, provided the request for such withdrawal is received by the Department, in writing or by fax before the time set for opening bids.

Bids shall not be withdrawn after the time designated for the public opening of such bids, except that when Bids for more than one project are to be opened at the same time, a Bidder, at its option, may submit a written request to withdraw its Bid for the second or succeeding project. The Bidder shall notify the Department, in writing, of its intent to exercise this option before the time set for opening of Bids. In such event, a short interval of time will be allowed between project Bid openings to allow the Bidder time to submit an executed Department of Transportation "Request for Withdrawal of Bid" form. Upon presentation of the executed form at the proper time, a Bidder's Bid will be returned unopened.

**102.12 Combination or Conditional Bids.**

If the Department so elects, Bids may be issued for projects in combination and/or separately, so that bids may be submitted either on the combination or on separate units of the combination. The Department reserves the right to make awards on combination bids or separate bids to the best advantage of the Department. Combination bids

other than those specifically provided for in the bid forms will not be considered. Separate Contracts will be awarded for each individual Project included in the combination.

Conditional Bids will be considered only when provided for in the Special Provisions.

**102.13 Acknowledgment of Revisions.**

When Addenda and other forms of notice giving revisions and interpretations of the Contract Documents are posted on the NJDOT Bid Express web site, acknowledgment thereof must be made by the Bidder. The acknowledgment shall be sent or hand delivered to the office and/or individual noted on the form and must be received before the Bid is opened. If the acknowledgment has not been received before the opening of bids, the bid envelope will be returned to the Bidder unopened. It is the obligation of the bidder to check the New Jersey Bid Express home page for addenda. The Department will not send addenda to individual prospective bidders, but will only post addenda on the New Jersey Bid Express home page. No addenda shall be posted less than 24 hours before the time set for the receipt of bids, with the exception of addenda postponing the bid opening date and time.

**102.14 Public Opening of Bids.**

Bids will be opened and read publicly at the time and place indicated in the Advertisement or such other time and place as may be established by Addendum. Bidders, their authorized agents, and other interested parties are invited to be present.

**102.15 Irregular Bids.**

Bids will be considered irregular and will be rejected by the Department if they are determined to contain a material defect.

**102.16 Disqualification of Bidders.**

The Department will disqualify a bidder and reject a bid submitted by that bidder if the bidder is determined by the Department to lack responsibility. Factors demonstrating a lack of responsibility shall include but not be limited to:

1. Evidence of collusion among bidders.
2. Uncompleted work, which in the opinion of the Department, might hinder or prevent completion of additional work if awarded.
3. Failure to satisfy the pre-award requirements of the Disadvantaged Business Enterprise attachment included in the Special Provisions for FHWA funded contracts.
4. The bid is materially unbalanced.

**102.17 Rejection of All Bids**

The Department may reject all bids when the Commissioner determines it is advisable to do so in the interest of the State or public.

## SECTION 103 - AWARD AND EXECUTION OF CONTRACT

**103.05 Performance Bond and Payment Bond.**

THE FOLLOWING IS ADDED TO THE FOURTH PARAGRAPH:

Reinsurance is prohibited pursuant to NJAC 16:44-6.1 (b)6.

**103.06 Execution and Approval of Contract.**
THE HEADING AND THE ENTIRE SUBSECTION IS CHANGED TO:

**103.06 Execution and Escrow of the Contract.**

1. **Execution.** The successful Bidder shall properly and duly execute a Contract in accord with Contract Documents and return same, together with the Performance Bond and Payment Bond, within ten State Business Days of the date of Award or Conditional Award. The successful bidder shall also provide the Department, within the same ten State Business Day period, proof of a valid business registration with the Division of Revenue in the New Jersey Department of Treasury. The Contract will not be entered into by the Department unless the Bidder first provides proof of a valid business registration in compliance with N.J.S.A. 52:32-44 (P.L. 2001, c134 ). For FHWA funded projects, the successful bidder shall also provide proof of valid, current registration with the New Jersey Department of Labor, Division of Wage and Hour Compliance as required by "Public Works Contractor Registration Act," N.J.S.A. 34:11-56.48 et seq. (P.L. 2003, c. 91). If said Contract is not executed by the Commissioner within 45 State Business Days following receipt from the Bidder of the executed Contract and Performance Bond and Payment Bond, the Bidder may within its discretion withdraw its bid without penalty; where the Bidder chooses not to withdraw prior to the Commisioner executing said Contract, the Bidder shall be deemed to have waived any claim for Additional Compensation or for an extension of time. The Contract shall not become effective until it has been fully executed by all parties.

2. **Escrow.** The successful Bidder who would like to participate in the Non-Binding Mediation of any and all claims arising under the Contract, as provided in Subsection 107.02, shall, within the same ten State Business Day period, escrow all of its bid preparation documents, which are dated prior to or as of submission of the bid proposal to the Department, in sealed boxes with a Custody Agent, and return to the Department a Custody Agreement fully executed by the Bidder and the Custody Agent. The Bidder shall also certify under oath that the escrowed documents have not been modified changed or corrected in any manner since the date appearing on said documents and that the documents escrowed constitute all related documents relied upon in preparing the proposal. The Custody Agreement Form will be provided by the Department at the time of Award and shall be completed in its entirety and include a detailed list of all documents contained in the boxes of bid documents placed in escrow.

   A failure by the Bidder to escrow its bid preparation documents and to return to the Department the fully executed Custody Agreement within ten State Business Days shall constitute a waiver by the Bidder of any ability or opportunity to participate in the Non-Binding Mediation of claims arising under the Contract. The use and preservation of escrowed bid documents shall be governed by the terms of the escrow agreement that is to be executed by the Contractor and the escrow agent, which agreement shall be in accord with the form provided by the Department. Upon Completion of the Contract, the Contractor may apply to the Department to release any escrowed documents so long as there are no pending claims.

## SECTION 104 - SCOPE OF WORK

**104.01 Intent.**
THE FIRST PARAGRAPH IS CHANGED TO:

The intent of the Contract Documents is to describe a functionally complete and aesthetically acceptable Project to be constructed and completed by the Contractor in every detail according to the Contract Documents. Any work that may be reasonably inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. The Contractor is responsible to provide such elements to complete the Work under the pay items of the Contract for no Additional Compensation as provided under Subsection 109.02. However, as specified in the respective Subsections, adjustments may be allowed when the Department determines there is a discrepancy, error, omission, or latent ambiguity. It is understood that only the best construction practice is to prevail and only materials and workmanship of the first quality are to be used.

**104.05 Increased or Decreased Quantities.**

## SECTION 105 - CONTROL OF WORK

**105.03 Plans and Specifications.**
THE ENTIRE TEXT IS CHANGED TO:

The Contract Documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. All components are complementary and describe and provide for the general completion of the Project. The Contractor shall keep one set of Plans, Special Provisions, Addenda, Standard Specifications, Supplemental Specifications, and Standard Details available on the Project site at all times.

In case of discrepancy, calculated dimensions will govern over scaled dimensions; Plans will govern over Specifications; Contract Documents will govern over Working Drawings, Right-of-Way Plans will govern over Plans when setting monuments; Special Provisions will govern over Supplemental Specifications; and Supplemental Specifications will govern over Standard Specifications.

The Contractor shall not take advantage of any apparent discrepancy, error, omission, or patent ambiguity in the Contract Documents. In the event the Contractor discovers any discrepancy, error, omission; or patent ambiguity in the Contract Documents, or if there is any doubt or question as to the intent or meaning of the Contract Documents, the Contractor shall immediately notify the Resident Engineer in writing with sufficient detail. The Department will promptly make, in writing, such corrections and interpretations as deemed necessary. The Contractor shall not be relieved of the obligation of completing an item of Work because of any discrepancy, error, omission, or patent ambiguity, and shall complete the Work as directed with adjustments as specified in Section 104. The Contractor shall not commence with any changes to the Work as provided under the Contract Documents without written authorization from the Department.

**105.04 Working Drawings.**

THE SECOND SENTENCE OF THE THIRD PARAGRAPH IS CHANGED TO:

Those provisions shall not apply to the review and approval of the design for proprietary walls, noise barriers, temporary sheeting, sheeting left in place, temporary structures, cofferdams, erection plans, traffic control/staging plans and precast concrete culverts or any other items where conceptual plans were included in the Contract Documents and the Contractor is required to complete the final design plans.

THE FOLLOWING IS ADDED TO THE ELEVENTH PARAGRAPH:

The design unit(s) shall be as designated for each Contract by letter from the Department.

THE FOLLOWING IS ADDED TO THE END OF THE SEVENTEENTH PARAGRAPH:

22. precast concrete cofferdams
23. composite lumber and piles

THE FOLLOWING IS ADDED TO THE END OF THE EIGHTEENTH PARAGRAPH:

9. emergency backup generator
10. bronze plaque
11. the Sept. 11 sign
12. demolition of bridge
13. precast concrete items not included in the seventeenth paragraph
14. composite lumber and piles
15. mansafe system
16. manufactured treatment devices
17. architectural treatments
18. banner brackets

**105.07 Coordination of Contract Documents.**

THE SUBSECTION HEADING AND TEXT ARE CHANGED TO:

**105.07 Purchase of Contract Documents.**

Request for Plans, Specifications, and Proposal Forms shall be directed to the Cashier of the Department, accompanied by a check for the proper amount, according to the rates on file, drawn to the order of the New Jersey Department of Transportation. Requests for those items furnished without charge shall be directed to the Bureau of Construction Services.

After Award, the successful bidder may request the number of sets of Plans specified below, without charge. One copy of Special Provisions and Addenda is furnished, without charge, with each set of the Plans. Additional sets or additional copies are available upon request, at a charge according to the Department rate.

**Table of Plans Furnished Without Charge**

| Amount of Contract | | Sets of Plans |
|---|---|---|
| For More Than | To and Including | |
| $ 0 | $ 500,000 | 1 |
| 500,000 | 1,000,000 | 2 |
| 1,000,000 | 5,000,000 | 3 |
| 5,000,000 | 10,000,000 | 4 |
| 10,000,000 | -- | 5 |

**105.09 Cooperation with Utilities.**

THE ENTIRE TEXT IS CHANGED TO:

**A. General.** It is understood and agreed that the Contractor has considered in its Proposal all of the permanent and temporary utility facilities in their present, new, or relocated positions to the extent required by the Contract Documents and as revealed by its own investigations; is aware that utility service demands, adverse field conditions and emergencies may affect the Utility's ability to comply with the proposed schedules for utility work; is cognizant of the limited ability of the Department to control the actions of the Utility(s), and has made allowances in its Proposal that it is not entitled to any Additional Compensation by reasons of delays, inconvenience or damage sustained by the Contractor due to any interference from utility facilities or the operation of moving or installing them. Similarly, the Contractor is deemed to understand that only limited extensions of time may be granted as specified in Subsection 108.11.

The Contractor shall notify, in writing, the Utility(s) involved of the nature and scope of the Project, and of its operations that may affect their facilities or property. The notice shall include an inquiry for all information required to determine the location of the existing utility facilities and the Contractor shall also provide the portion of the approved Preliminary Schedule relative to that respective Utility. Two copies of such notices and the Utility's responses shall be sent to the Resident Engineer prior to the start of Construction Operations. The Contractor shall also attend a Utility preconstruction conference prior to the start of Construction Operations.

The Contractor shall provide each Utility the portion of the approved Baseline CPM Schedule related to the respective Utility and any approved updates or revisions that affect that Utility.

Information on the Utility(s), including the work to be performed by the Utility(s) on the Project, will be provided in the Special Provisions.

The corporations, companies, agencies, or municipalities owning or controlling the utilities, and the name, title, address, and telephone number of their local representative are as listed below:

**ELECTRIC**

Mr. William E. Uellner,
Supervisor of Major Projects
Jersey Central Power & Light Company
331 Newman Springs Road
Red Bank, NJ 07701

Telephone: 732-212-4246
Mr. Fred Corcione, Engineer
Telephone: 732-212-4248

**TELECOMMUNICATION**

Mr. Frank Antisell, Staff Manager–Joint Use ROW
Verizon – NJ, Inc.
900 Clinton Avenue, 2nd Floor
Irvington, NJ 07111
Telephone: 973-649-3007

Mr. Warren Ryllo, Engineer
Eastern Shore OPE
5100 Belmar Boulevard
Farmingdale, NJ 07727
Telephone: 732-751-8725
Chas. J. W. Heitzenroder, Conduit Design Engineer
Telephone: 732-214-3907

**GAS**

Mr. John B. Wyckoff P.E., Manager
New Jersey Natural Gas Company
1415 Wyckoff Road
P.O. Box 1464
Wall, NJ 07719
Telephone: 732-938- 7864
Mr. Joseph Puglisi, Design Engineer
Telephone: 732 919-8293

**WATER**

Brick Township Municipal Utilities Authority
Mr. Stephen Specht, Director of Engineering
1551 Highway 88
Brick, NJ 08724
Telephone: 732-458-7000 Ext. 247
Mr. Dave Guetzlaff, Engineer
Telephone: 732-458-7000, Ext. 285

Borough of Brielle
Alan P. Hilla, Jr.
Birdsall Engineering
611 Industrial Way West
Eatontown, NJ 07724
Telephone: 732-380-1700 Ext. 1216

**SANITARY**

Ocean County Utilities Authority
Mr. Tariq M.S. Siddiqui,
Director of Engineering & Construction
501 Hickory Lane
Bayville, NJ 08721

Brick Township Municipal Utilities Authority
Mr. Stephen Specht, Director of Engineering

1551 Highway 88
Brick, NJ 08724
Telephone: 732-458-7000 Ext. 247
Mr. Dave Guetzlaff, Engineer
Telephone: 732-458-7000, Ext. 285

Borough of Brielle
Alan P. Hilla, Jr.
Birdsall Engineering
611 Industrial Way West
Eatontown, NJ 07724
Telephone: 732-380-1700 Ext. 1216

**CABLE**

Cablevision of Monmouth, Inc.
Mr. Hollis Orderson, Design Supervisor
40 Pine Street
Tinton Falls, NJ 07753
Mr. Paul Kostyz, Design Engineer
Telephone: 732-681-8222 Ext. 3285

Comcast Cablevision of Ocean County, Inc.
Mr. Richard Gugulski, Outside Plant Engineer
800 Rahway Avenue
Union, NJ 07083
Telephone: 908-851-8857

Bidders are advised to verify the above information as its accuracy and completeness is not guaranteed by the Department.

**Utility Work and Time Frames**
**General Notes:**

1. State's resident engineer will provide the utility with the notices called for in the schedules.
2. State will provide the utility with survey control. The State and the utility shall jointly verify the location of the facilities prior to installation.
3. Poles shall be placed as close to the right-of-way as practical, minimum of 18" from face of curb to face of pole.
4. Utility schedules are estimated time frames for this utility owner only and do not include work performed by other utility owners sharing joint facilities.
5. Utility schedules are based on the projected traffic control and staging plan for each utility mobilization. Utility service demands, field and weather conditions may alter these schedules. State (contractor) changes to the traffic control and staging require reestablishing utility schedules.
6. Where joint facilities are proposed, the utility shall coordinate its work with the joint owners.
7. Existing facilities can only be removed after the relocated facilities have been installed and are in operation.
8. Distances, stations, offsets, lengths or units on the utility plans are approximate (plus or minus).

**Jersey Central Power and Light Company– Electric**

Existing Facilities
Aerial Primary and Secondary

**Time Restrictions for JCP&L**

No power outages from May 1st to September 15th, inclusive.

## Work to be performed by Utility

**1.** WORK TO BE PERFORMED BEFORE STAGE 1 CONSTRUCTION. River road Station 9+06 LT (Pole #JC246BK) to Rt. 70 EB Station 78+43 RT (Pole #JC657). Remove existing aerial facilities.

**2.** Riviera Drive Station 11+02 (New Pole) to Route 70 Station 78+00. Install 5 Poles and construct 120v/240v circuit.

**Schedule:** 1&2 Utility requires 6 weeks notice and 30 working days to do work

**3.** Riviera Drive Sta. 13+55RT(Pole #JC245-1BK) to River road Station 5+50 RT (Pole #JC248BK). Install 5 – 65 foot Poles and Construct 12.5 kv primary feeder and 34.5 kv transmission lines from pole #JC245-1BK located on Main Street and Rivera Drive than along westerly side of Rivera Drive Crossing Route 70 and Ramp B, then crossing River Road to Pole #JC248BK.

**4.** Riviera Drive Sta. 13+55RT(Pole #JC245-1BK) to River Road Sta. 5+50RT (Pole #JC248BK) Remove existing abandoned aerial facilities.

**Schedule:** 3 & 4 Utility requires 6 weeks notice and 60 working days to do the work.

**5.** WORK TO BE PERFORMED BEFORE STAGE II CONSTRUCTION. Rt. 70 Sta. 85+12LT (Pole #JC40BRE) to Bridge Operation Control House. remove existing abandoned aerial facilities.

**Schedule:** 5 Utility requires 6 weeks notice and 5 working days to do the work.

**7.8.9.** Furnish 8' x 8' x 16' Manholes to be installed by State's Contractor. Inspection of Work to be performed by State's contractor on the Utilities facility.

**10.** Sunset Drive pole #BT338BRE construct primary circuit from pole #BT338BRE to relocated pole (#BT68BRE) by Verizon-NJ, Inc. via utility easement and relocate secondary aerial feeder.

**11.** Ramshorn Drive Sta. 1+61LT(Pole #JC558BRE) to Sunset Drive via Rt.70EB to pole #BT338BRE remove existing abandoned aerial facilities.

**Schedule:** 10 & 11 Utility requires 6 weeks notice and 30 working days to do the work.

**12.** Riviera Drive Sta. 14+28 RT, 24' install new pole & relocate aerial facilities.

**Schedule:** 12 Utility requires 6 weeks notice and 30 working days to do the work.

### Work to be performed by the State (Contractor).

Clear Site for installation of Poles, conduits, wires and appurtenances and provide any necessary access (guiderail opening and grading as required).

**6.** Route 70 Station 78+00 (New Pole by JCP&L Co.). Install conduit from its load center to new pole and connect to 120v/240v circuit.

**7.** Route 70 Station 74+00 to Station 78+81.25. Construct 10-6" diameter PVC conduits encased in concrete. This proposed facility is a betterment.

**8.** Rt. 70 Sta. 77+81.25 to Sta. 85+60.25 install 734 feet of 10-6" inside diameter schedule 40 conduits, hangers, sleeves, clamps, expansion joints and two (2) manholes (Sta. 77+81.25 & Sta. 85+60.25) to be furnished by JCP&L Co. This proposed facility is betterment.

**9.** Route 70 Station 85+60.25 to 89+70 LT. Construct 10-6" diameter PVC conduits, install manhole to be furnished by JCP&L Co. and 20' stubs encased in concrete. This proposed facility is a betterment.

**Schedule:** 1, 7 through 9. Included in Contractors' overall construction operations of the project.

### Verizon – New Jersey, Inc. (Telecommunications)

Existing Facilities

Aerial copper and fiber cables within the project limits

### Work to be performed by Utility.

**1.** Riviera Drive Sta. 13+55RT(Pole #JC245-1BK) to River Road Sta. 5+50RT(Pole #JC248BK) Construct 1-100 pr. and 1-400 pr., copper cable on poles installed by JCP&L Company.

**2.** Riviera Drive Sta. 13+55RT(Pole #JC245-1BK) to River Road Sta. 5+50RT (Pole #JC248BK) remove existing abandoned aerial facilities.

**Schedule:** 1 & 2 Utility requires 6 weeks notice and 30 working days to do work.

**3.** Riviera Drive Sta. 11+03 RT, to Sta. 78+6.25 construct 1 manhole, 6-4" dia. PVC duct bank and a riser at new pole installed by JCP&L Co. This proposed facility is betterment.

**Schedule:** 3 Utility requires 6 weeks notice and 30 working days to do work.

**4.** Inspection of work to be performed by State's contractor on the Utility's facility.

**5.** Rt. 70. Sta. 85+40.25 to Sta. 89+70LT pole #JC357BRE located on River Road construct 1 manhole, 6-4" dia. PVC duct bank and a riser at pole #JC357BRE. This proposed facility is betterment.

**Schedule:** 5 Utility requires 6 weeks notice and 30 working days to do work.

**6.** Route 70 Sta. 87+31 demolish manhole and remove pole #BT104-75BRE.

**Schedule:** 6 Utility requires 6 weeks notice and 10 working days to do work.

**7.** Route 70 EB Sta. 104+66 (pole #BT64BRE) to Sunset Drive pole #BT338BRE install two poles in utility easement. Construct 2-4" PVC ducts from pole #40008BRE on Riverview Drive to pole #BT340BRE on Sunset Drive and construct risers at each pole. Construct 50 pair and 300 pair, aerial copper cable from Rt. 70 EB pole #BT64BRE to pole #BT68BRE located in the utility easement.

**8.** Route 70 EB Sta. 104+66 (pole #BT64BRE) to Sunset Drive pole #BT340BRE remove abandoned existing aerial facilities.

**Schedule:** 7 & 8 Utility requires 6 weeks notice and 30 working days to do work.

**9.** Riviera Drive Sta. 14+28 RT, 24' relocate aerial facilities to new pole installed JCP&L Co.

**Schedule:** 9 Utility requires 6 weeks notice and 5 working days to do the work.

**Work to be performed by the State (Contractor).**

**4.** Rt. 70. Sta. 78+6.25 to Sta. 85+40.25 install 734 feet of 6-4" inside diameter schedule 40 conduits, hangers, sleeves, clamps, expansion joints and associated appurtenances. This proposed facility is betterment.

**Schedule:** 4 Included in Contractors' overall construction operations of the project.

**New Jersey Natural Gas Company**

Existing Facilities

Gas main, valves, Pressure Regulating Station and appurtenances are within the project limits.

**Time Restrictions for NJ Natural Gas Company**

No disruption to system from October 1st to April 30th, inclusive.

**Work to be performed by Utility.**

**1.** Riviera Drive Sta. 14+08 to River Road Sta. 6+45 construct 4" plastic gas main, install 4" gas valve and construct Pressure Regulating Station.

**2.** Riviera Drive Sta. 14+08 to River Road Sta. 6+45 cut, purge, plug, and abandon existing 100mm(4") steel gas main.

**Schedule:** 1 & 2 Utility requires 16 weeks notice and 20 working days to do work.

**3.** River Road Sta. 7+23 and Eton Lane reconnect 2" gas main to new 4" gas main.

**Schedule:** 3 Utility requires 1week notice and 1 working day to do work.

**4.** Riviera Drive Sta. 14+26 and River Road reset four (4) gas valve boxes to proposed grade.

**Schedule:** 4 Utility requires 1week notice and 1 working day to do work.

**5.** Riviera Drive Sta. 14+32 to Sta. 14+62 lower 2" HP steel gas main.

**Schedule:** 5 Utility requires 1week notice and 5 working days to do work.

**6.** Riverview Drive Sta. 4+85 to Sta. 6+00 construct 2" Plastic HP gas main.

**7.** Riverview Drive Sta. 4+85 to Sta. 6+00 cut, purge, plug & abandoned 2" HP steel gas main.

**Schedule:** 6 & 7 Utility requires 1week notice and 5 working days to do work.

**Cablevision of Monmouth, Inc.– Cable TV**

Existing Facilities

Aerial coaxial, fiber and strand within the project limits.

**Work to be performed by Utility.**

**1.** Ramshorn Drive Sta. 1+61(pole #JC558BRE) to Sunset Drive, via Rt. 70, to pole #BT338BRE construct 72 fiber optic cable in 2-4" ducts and risers to be constructed by State's contractor.

**2.** Ramshorn Drive Sta. 1+61(pole #JC558BRE) to Sunset Drive via Rt. 70 to pole #BT338BRE remove abandoned existing aerial facilities.

**Schedule:** 1 & 2 Utility requires 2 weeks notice and 20 working days to do the work.

**Work to be performed by the State (Contractor).**

**1.** Ramshorn Drive Sta. 1+61LT(pole#JC558BRE) to Sunset Drive, via Rt. 70EB to pole #BT338BRE construct 2-4" inside diameter ducts by open cut method and encase in concrete. Construct 3 traffic bearing hand holes. Construct riser at pole#BT300BRE & #BT338BRE.

**Schedule:** 1 Included in Contractors' overall construction operations of the project.

**Comcast Cablevision of Ocean County– Cable TV**

Existing Facilities

Aerial coaxial, fiber and strand within the project limits.

**Work to be performed by Utility.**

**1.** Riviera Drive Sta. 13+55RT(Pole #JC245-1BK) to River Road Sta. 5+50RT(Pole #JC248BK) construct .875", .625", .500" coaxial cables, 12 fiber optic cable and .25" support strand.

**2.** Riviera Drive Sta. 13+55RT(Pole #JC245-1BK) to River Road Sta. 5+50RT(Pole #JC248BK) remove abandoned aerial facilities.

**Schedule:** 1 & 2 Utility requires 2 weeks notice and 15 working days to do the work.

**3.** Rt. 70. Sta. 78+6.25 to Sta. 85+40.25 furnish 734 feet of 2-4" inside diameter schedule 40 PVC conduits, hangers, sleeves, clamps expansion joints and associated appurtenances to be installed by State's contractor. This proposed facility is a betterment.

**4.** Rt. 70 Sta. 74+94 to Sta. 78+6.25 construct 2-4" dia. PVC conduits, 1-24"x40" hand hole. This proposed facility is betterment.

**Schedule:** 4 Utility requires 6 weeks notice and 15 working days to do the work.

**5.** Rt. 70 Sta. 85+40.25 to Sta. 88+42 LT construct 2-4" dia. PVC conduits, 1-24"x40" hand holes. This proposed facility is betterment.

**Schedule:** 5 Utility requires 6 weeks notice and 15 working days to do the work.

**6.** Riviera Drive Sta. 14+28 RT, 24' relocate aerial facilities to new pole installed JCP&L Co.

**Schedule:** 6 Utility requires 2 weeks notice and 5 working days to do the work.

**Work to be performed by the State (Contractor).**

**3.** Rt. 70. Sta. 78+6.25 to Sta. 85+40.25 install 734 feet of 2-4" inside diameter schedule 40 PVC conduits, hangers, sleeves, clamps, expansion joints and associated appurtenances furnished by the Utility. This proposed facility is betterment.

**Schedule:** 3 Included in Contractors' overall construction operations of the project.

**Brick Township Municipal Utilities Authority**
**Water**

**Work to be performed by the Brick Township Municipal Utilities Authority**

Inspection of facilities constructed by the State's contractor.

**Schedule:** Brick Township Municipal Utilities Authority requires 2 weeks notice.

Existing facilities

8" water main, fire hydrants and appurtenances within the project limits.

**Work to be performed by the State (Contractor).**

**1.** Riviera Drive Sta. 13+49 to River Road Sta. 8+00 construct 135 linear feet of 16" diameter, ½" thick, steel casing across Route 70. Steel casing to be continuous and installed by open cut method. Construct 8" DICLP water main, fire hydrant assembly, gate valves and 8"x 6" reducer. Encase 8" DICLP water main in polyethylene tubing. Remove plugs and connect to existing 8" and 6" DICLP water main only after the new water main has been satisfactorily tested and accepted by Brick Township Municipal Utilities Authority. This proposed facility is betterment.

**2.** Riviera Drive Sta. 13+84RT and Sta. 14+30RT, River Road Sta. 7+39RT, Sta. 7+37RT and Sta. 6+25 reset water valve boxes to proposed grade.

**3.** Riviera Drive Sta. 14+29 reset fire hydrant to proposed grade.

**4.** River Road Sta. 6+25 reset fire hydrant to proposed grade.

**Schedule:** 1 – 4 to be performed in a manner with the State's overall construction project.

**Note:** There will be no shot down of existing water facilities without Brick Township Municipal Utilities Authority's approval.

**Brick Township Municipal Utilities Authority**
**Sanitary Sewer.**

**Work to be performed by the Brick Township Municipal Utilities Authority**

Inspection of facilities constructed by the State's contractor.

**Schedule:** Brick Township Municipal Utilities Authority requires 2 weeks notice.

Existing facilities

8"sanitary sewer mains and manholes within the project limits.

**Work to be performed by the State (Contractor).**

**1.** Eton Lane manhole #14-57A to Riviera Drive Sta. Sta. 10+83LT(manhole #14-55) at Rt. 70, and Ramp B construct 140 & 40 respectively linear feet of 16" dia., 1/2 " thick steel casing to be continuous and installed by open cut method. Replace existing 8" ACP with 8" DICLP polyethylene encased sanitary main. Contractor shall maintain flow during main replacement by furnishing and operating by-pass pumping equipment. Connect new sanitary main to existing sanitary main at end of each working day. Demolish manhole #14-56 at Rt. 70 Sta. 71+21LT, 9.

**2.** Main Street Sta. 117+83LT(manhole 14-54A), Riviera Drive Sta. 14+66RT(manhole14-53) & Sta. 14+00(manhole), Eton Lane Sta. manhole 14-57A and River Road Sta. 7+26RT(manhole 14-57) adjust manhole castings to proposed grade.

**3.** Riviera Drive Sta. 10+83LT (manhole #14-55) reconstruct manhole.

**Schedule:** 1, 2 & 3 Performed in a manner with the State's overall construction project.

**Borough of Brielle**
**Water**

**Work to be performed by the Borough of Brielle Municipal Utilities Authority**

Inspection of facilities constructed by the State's contractor.
**Schedule:** Borough of Brielle Municipal Utilities Authority requires 2 weeks notice.

Existing facilities

8"water main, fire hydrants and appurtenances within the project limits.

**Work to be performed by the State (Contractor).**

**1.** River Road Sta. 0+55 to Rt. 70 Sta. 89+35RT, 52 feet construct 108 linear feet of 16" dia., ½" thick steel casing. Casing to be continuous and installed by open cut method.
**2.** River Road Sta. 0+75 to Rt. 70 Sta. 89+33 RT, 77' construct via 16" steel casing, 8"DICLP polyethylene encased water main and 2- 8" gate valves and water valve boxes.
**3.** Rt. 70 Sta. 89+33RT, 77' to water main at Cedar Ave., construct 8"DICLP polyethylene encased water main. This facility is betterment.
**4.** Connect new water main at River Road and Cedar Ave. to existing water mains only after new 8" water main has been satisfactorily tested and accepted by the Borough of Brielle. Cut, plug and abandon existing water main.
**5.** River Road Sta. 0+74 reset fire hydrant assembly to proposed grade and connect to new water main.
**6.** River Road Sta. 0+60 remove water meter, shut off bridge operator's house water service line at the main and abandon it. Water meter is to be delivered to the Borough of Brielle.
**7.** Construct new 1" water service to pumping station.
**8.** Rt. 70 Sta. 100+07 & Sta. 106+17 reset water valve box to proposed grade.
**9.** Rt. 70 Sta. 106+17 reset fire hydrant to proposed grade.
**Schedule:** 1 – 9 Performed in a manner with the State's overall construction project.
**Note:** There will be no shut down of existing water facilities without Brielle Municipal Utilities Authority's approval.

**Borough of Brielle**
**Sanitary Sewer**

**Work to be performed by the Borough of Brielle Municipal Utilities Authority**

Inspection of facilities constructed by the State's contractor.
**Schedule:** Borough of Brielle Municipal Utilities Authority requires 2 weeks notice.

Existing facilities

203mm(8") sanitary sewer mains and manholes within the project limits.

**Work to be performed by the State (Contractor).**

**1.** River Road Sta. 0+54 to Rt. 70 Sta. 89+30RT, 53' construct 107 linear feet of 16" dia., ½" thick steel casing. Casing to be continuous and installed by open cut method.

**2.** River Road Sta. 0+61(manhole) to Rt. 70 Sta. 89+26 RT, 79' (manhole) construct via 16" steel casing, 8" DICLP polyethylene encased sanitary main. Contractor shall maintain flow during main replacement by furnishing and operating by-pass pumping equipment. Connect new sanitary main to existing sanitary main at end of each working day.

**3.** River Road Sta. 0+61, Rt. 70 Sta. 89+26 RT, 79' and Rt. 70 Sta. 87+37LT, 68' adjust manhole castings to proposed grade.

**4.** Rt. 70 Sta. 87+37LT, 68' (manhole) plug bridge operator's house sanitary lateral and abandon it only after the bridge operator's house is demolished.

**Schedule:** 1 - 4 Performed in a manner with the State's overall construction project.

**B. Existing Facilities**. The Contractor shall not proceed with any excavation operations until it has determined the exact location of the existing utility facilities within the Project from examination of the Contract Documents and information provided in Subsection 102.06, through inquiries to the respective Utility(s), and through its own subsurface site investigations, including test pits. Test Pits shall be as specified in Subsection 207.04. The Contractor shall notify the Resident Engineer as specified in Subsection 105.03 if their examinations determine any conflicts to completing the Work.

The Contractor shall notify the Resident Engineer at least 10 State Business Days in advance of the excavation of any test pits, or other subsurface investigations. Bidders shall notify the Department in advance as specified in Subsection 102.06.

Electrical installations, including Intelligent Transportation Systems (ITS) facilities as specified in Section 706, of the Department constructed either before or as part of the Contract shall be considered a Utility, and all provisions of this Subsection and Division 700 shall be applicable.

Examination of Department documents available on existing electrical installations shall be as specified in Subsection 102.06. The Contractor may request markout for the fiber optic network of the Department ITS facilities. Markout will be provided within ten Working Days after the completed, written Traffic Operations Markout Form is received by the Traffic Operations location specified in the Special Provisions in this Subsection. The Contractor shall copy the Resident Engineer on the written request and shall maintain the markout until all operations in the vicinity of the ITS facilities are completed.

**C. Regulations**. The Contractor shall also comply with all other State and Federal rules, and regulations applicable to work on or in the proximity of utilities. Specific attention is made to:

1. The State's Underground Facility Protection Act. The Contractor shall notify the State's One Call System (1-800-272-1000) and identify itself as the State's Contractor and specify the route and contract number of the Project before performing Work on the Project.
2. High voltage line requirements according to NJSA 34:6-47.1 to 47.9, 29 CFR 1926.550, and the Utility Accommodation Policy, NJSA 16:25. The Contractor shall obtain written approval from the Department of Labor, Office of Safety Compliance, and the respective Utility(s) if required, for any operations that do not provide the minimum clearances under these regulations. The Contractor shall be responsible for any proposed power outage or de-energization associated with their operations. A copy of the approvals shall be submitted to the Resident Engineer at least 5 State Business Days in advance of starting those operations.

**D. Notices**. The Contractor shall make a written request to the Resident Engineer at least 10 State Business Days in advance of the notice requirements provided in the Special Provisions for the Department to notify Utility(s) to proceed with the Utility(s) utility work. The Contractor shall be cognizant that where joint use poles or duct banks are used, the time frames for work performed by each user are cumulative. The Contractor shall guarantee the site availability for utility operations. The Department will notify the Utility(s) to proceed if in the Department's opinion the site will be available for a particular item of utility work. The Contractor shall permit the Utility(s) or their agents access to their facilities at all times and shall cooperate with them in performing their work.

The Contractor shall cooperate with the Utility(s) concerned and shall notify them, through the Resident Engineer, not less than 10 State Business Days in advance of the time it proposes to construct any utility item or perform any work that may endanger or affect their facilities. The Contractor shall

have the contractual obligation of coordinating its activities with those of the Utility(s). The Utility(s) shall be given the opportunity to inspect the actual material to be installed as well as the installation.

The Contractor shall provide 72 hour advance notice to the Resident Engineer of any meetings scheduled with Utility(s) and provide the Resident Engineer with a copy of any correspondence with the Utility(s).

The Contractor shall make separate written notifications, with a copy to the Resident Engineer, a minimum of 4 State Business Days prior to when work may impact or be adjacent to Department electrical installations. For ITS facilities, notification shall be to the Bureau of Traffic Operations at the location and telephone number provided in the Special Provisions. For all other electrical installations, notification shall be made to the Regional Bureau of Electrical Maintenance at the location and telephone number provided in the Special Provisions. No Department-owned installation shall be accessed, modified, removed, or disturbed in any manner, without first making such notifications and attending a meeting with the Department if requested.

Bureau of Electrical Maintenance, Central Region
100 Daniels Way
Freehold, NJ 07728
Telephone: 732-308-4086
Bureau of Traffic Operations, South Region (TOCS)
1 Executive Campus-Route 70 West
Cherry Hill, NJ 08002-4123
856-486-6650

**E. Damages**. The Contractor shall protect, support, and secure all in-place utility facilities so as to avoid damage to them and any interruption of service. The Contractor shall not temporarily move existing or completed utility facilities without the Utility(s) written consent, and the facilities shall be as safe and permanent at completion as they were before the Contractor's involvement. In the event the Contractor damages a utility facility, including property service connections, the Contractor shall notify the Utility(s) immediately. The Utility(s) may complete the repairs or allow the Contractor to complete the repairs, with the Contractor responsible for any applicable time and expense. Repairs to Department electrical installations shall be as specified in Subsection 105.19 and the additional requirements for the fiber optic network of the Department ITS facilities as specified in this Subsection. The fiber optic network includes the conduit/cable, junction boxes/cabinets, and hubs.

Within two hours of any damage by the Contractor to the fiber optic network, the Contractor shall notify the Resident Engineer, in writing with a copy to the Traffic Operations contact specified in the Special Provisions, that the Contractor shall complete the repairs within 48 hours and have the repairs underway within 12 hours after the damage has occurred. If the written notice has not been received from the Contractor within two hours and/or the commencement of the repairs has not started within 12 hours, the Department may undertake and complete the repairs. The cost of repairs made by the Department for damages that are determined by the Resident Engineer to be the Contractor's responsibility shall be deducted from subsequent estimates. If the Contractor does not complete the repairs within 48 hrs, damages for lost services will be assessed to the Contractor at a minimum of $1000 per hour, or increased based on costs calculated by the Department, and deducted from subsequent estimates.

Should the Contractor, for its own convenience, cause the Utility(s) to incur costs not covered by the utility agreement, or delay the Utility(s), or incur costs without prior written approval of the Resident Engineer, the Contractor shall be responsible for these costs and delays. The Contractor shall pay the Utility(s) within 30 days of the Utility(s) request for cost reimbursement of any repairs and other incurred costs. If payment has not been made within 30 days, the Department may reimburse the Utility(s) for the Contractor generated costs and deduct these expenses from partial or final payment due the Contractor.

**F. Railroads**. In addition to the foregoing provisions, the following specific provisions relate to railroads only:

**1. Railroad Traffic and Property.** Where the Project includes work across, over, under, or adjacent to railroad tracks or railroad ROW, the Contractor shall safeguard the traffic, tracks, and appurtenances, and other property of the railroad that may be affected by its Work. The Contractor

shall comply with the regulations of the railroad relating to its Work, shall keep tracks clear of obstructions, and shall provide barricades, warning signs, lights, or other safety devices as required by the railroad. Payment for such safety devices will be made as specified in Section 617. Prior to the commencement of any work within the railroad ROW or on railroad facilities, the Contractor shall obtain the railroad's written approval of access, the method of construction, and the schedule of the Work. The Contractor shall provide a copy of the submittal and approval to the Resident Engineer.

Estimated railroad train schedules will be provided in the Special Provisions.

The safety and continuity of railroad operations shall be the first priority when working in proximity to the railroad. Railroad approval does not release the Contractor from responsibility or liability for any damage that the railroad may suffer, or for which the Contractor may be held liable, by the acts of the Contractor.

Fouling of railroad facilities' track, power lines, and signal systems occurs when the railroad parameters for normal operations are jeopardized because obstructions are in close proximity to the facilities. The Contractor shall obtain from the railroad its fouling parameters for the work site and observe the railroad's regulations concerning fouling. Construction equipment or material shall not be stored or operated within the fouling distance of the railroad facilities without written permission of the railroad, with a copy to the Resident Engineer.

The railroad may assign inspectors, engineers, or flagmen during the time the Contractor is engaged in work on railroad property for the general supervision of construction operations, to ensure adherence to the Contract Documents and applicable railroad requirements, and to ensure the use of approved construction methods.

If materials are to be hauled across the tracks of any railroad, the Contract Documents will provide for any new crossings required or for the use of any existing crossings. If the Contractor elects to use crossings other than those designated, it shall obtain written approval from the railroad with a copy of the approval to the Resident Engineer at least 10 State Business Days in advance.

**2. Railroad Insurance.** The applicable insurance provisions are as specified in Subsection 107.23.

**105.11 Construction Stakes, Lines and Grades.**

**A. For Projects with Construction Layout as a pay item.**

THE FIFTH PARAGRAPH IS CHANGED TO:

The Contractor shall complete all utility work layouts required after approval of the insurance certificates as specified in subsection 107.23 and the Safety and Health Program as specified in Subsection 107.10. The Contractor shall notify the Utility(s) as specified in Subsection 105.09.

**105.15 Field Office.**

**1. Construction Field Offices.**

**a. Type A.**

THE FOLLOWING IS ADDED:

(1) Six (6) multi-line touch-tone telephones and three (3) telephone lines for use with the telephones installed as directed and operational in the Field Office and other facilities specified.

(a) Four (4) dedicated, operational telephone line(s) for Fax machines (s) and/or microcomputer system(s) modem use installed as directed in the Field Offices specified.

(b) Six (6) portable hand held cellular phone(s), each with two-way radio capability. The cellular telephone plan shall provide for the anticipated usage of approximately 300 minutes per telephone per month. Each of the cellular phones shall have as a minimum the following features:

1) Home rate with no roaming charges within the entire state

2) 832 Channel Compatible
3) Mute Function
4) Back Light Display with Battery Saver
5) Signal Strength Indicator
6) Individual Call Length Timer
7) Full Lock Function
8) 30 Memory Number Feature
9) Low Battery Warning
10) 70 Minute Continuous Use
11) 12 hour Standby Mode
12) Alphanumeric Display
13) Transmission Power 0.6 Watt
14) Passive Repeating Antenna for Vehicle
15) Spare high capacity Battery Pack
16) Home Charging Station
17) Cigarette lighter power adapter /charger
18) AC charging station

THE FOLLOWING IS ADDED:

19) Hands-Free headset

(c) Zero (0) pager units. The number should be an exchange local to the Project. The units shall have the following features:

1) Lighted Alphanumeric Display
2) Tone and Vibrator Alert
3) High Sensitivity
4) Message Storage
5) Statewide Coverage
6) Exchange Local to Project
7) LCD Readout

(d) One (1) telephone answering machine or Voice Mail service

(12) The compact copying machine shall also have 11-inch by 17-inch copy size capability, in addition to the usual letter size and legal size capabilities.

(17) The microcomputer system shall include the following:

(a) Three (3) base computer system(s) each having at minimum:

1) Pentium IV Processor at 1.5 GHz or faster, Intel processor with MMX technology, with a 512 MB RAM, 32 MB Video RAM, mouse, mouse pad, 60 GB hard drive, one 52X DVD-ROM Drive, one CD-R Recordable Drive, and one 3½-inch, 1.44 MB floppy diskette drive installed as the "A" drive.
2) 56K baud data/fax modem. (e.g., 3Com U.S. Robotics 56K Faxmodem, 3Com U.S. Robotics Courier V.Everything/V.34 - 56K ITU / x2 Technology, or Hayes Accura 56K).
3) One network card for each base computer system specified, when more than one base computer is specified
4) One Fast Ethernet Hub Switch with appropriate number of ports and cables (e.g., 3COM 100 Hub)
5) One dedicated telephone line to be used in conjunction with the microcomputer modem.
6) 19-inch (483-millimeter) or larger Super VGA color monitor having a dot pitch of 0.28, with anti-glare screen, and tilt/swivel capabilities.
7) 250-Megabyte Zip Drive internal or external with backup software for MS Windows and thirty 250-Megabyte formatted data cartridges corresponding to the tape drive size (e.g., Iomega Zip Drive or equivalent).
8) Uninterruptible power supply (UPS) - OMNI 1000 or approved equal (e.g., APC-1000 - American Power Corporation).
9) Surge protector for the entire computer workstation to be used in conjunction with the UPS (e.g., Zero Surge Power, Inc. - Point of Use - 2R-15 amp/120 volts).
10) Static mat, floor type, 4 by 5 feet or larger with grounding capabilities.
11) Computer workstation, printer stand, and/or table having both appropriate surface and chair height.

12) Five boxes of 3½-inch floppy diskettes that match the drive density of the 1.44-MB floppy diskette drive (ten per box).
13) 150 CD-R 700-MB (or larger) recordable CD's compatible to CD drive.
14) One floppy diskette holder (holds 50, 3½-inch floppy diskettes), and dust covers for the microcomputer, monitor, keyboard, and printer.
15) Two head cleaner kits for 3½-inch floppy diskette drive.

(b) Two (2) base printers each having at minimum:

1) Laser printer having HP PCL 5 emulation, with a 64 Megabyte expanded memory, appropriate printer cable, and legal size tray (e.g., HP-2200 or equivalent).
2) One printer toner cartridge every other month for the duration of the construction project.
3) One 10-ream carton of 8½ X 11 inches size paper (500 sheets per ream, weight: 22 ounces per square yard, color: white, grain: long, for laser printers and copiers) every two months for the duration of the construction project.
4) One 10-ream carton of legal size paper (500 sheets per ream, weight: 22 ounces per square yard, color: white, grain: long, for laser printers and copiers) every three months for the duration of the construction project.

(c) Three (3) software packages, on CD-ROM with documentation, including:

1) Microsoft Windows, latest version with future upgrades.
2) Microsoft Office Professional, latest version. Software package should contain the following: word processor, spreadsheet, and database.
3) Helix Nuts and Bolts Advanced Utilities for Windows, latest version, or compatible software package.
4) Anti-Virus software, latest version with monthly updates (e.g., Norton's Anti-Virus, McAffe Anti Virus, or Dr. Solomon's).
5) Visio Professional Graphics Software for Windows, latest version.

(d) Two (2) base printer(s) for Primavera having at minimum:

1) Color Inkjet printer of current technology, with appropriate printer cable.
2) Ink cartridge replacements, one of each color, every other month for the duration of the construction project.
3) One 10-ream carton of 8½ X 11 inches size paper (500 sheets per ream, weight: 22 ounces per square yard, color: white, grain: long, for laser printers and copiers) every three months for the duration of the construction project.

(e) Three (3) Primavera Project Planner (P3) or equivalent software, latest version.

To be approved as a Substitute or "Or Equal", the software must be completely compatible with the Department database that contains the Capital Program Management's design process schedule and budget, as well as the construction scheduling from design through construction. The software shall be compatible with the hierarchy of the coding and able to import and export data within the Department's Capital Program Management's database without distortion of any coding or relationships contained in the database.

The Contractor shall only utilize equivalent or compatible software for a project, which has received written approval from the Department in accordance with the most current NJDOT Capital Program Management Construction Scheduling Standard Coding and Procedures for Designers and Contractors Manual. The approved equivalent/compatible software utilized shall not vary throughout the construction phase.

The following additional equipment shall be furnished by the Contractor for the exclusive use of the Resident Engineer. This equipment shall conform to the applicable ASTM designation, when appropriate, and be in good working condition. The Contractor shall repair or replace damaged equipment throughout the duration of the Contract. The equipment shall become the property of the Contractor after Acceptance:

- Ten (10) of each: hard hats (Orange in color, reflectorized) and safety vests (Orange in color, reflectorized, 360 degrees high visibility that meet ANSI/ISEA standards for Class 3 garments). Safety vests are to be replaced as needed for the duration of the project.
- Ten (10) sets: ear protection and eye protection, to be replaced as needed for the duration of the project.
- Ten (10) sets: rain gear with retro-reflective sheeting.

- Concrete testing equipment to include [one (1) of each]:Concrete receptacle (wheel barrow), square tipped shovel. Concrete scoop, slump cone & base set (rod, slump cone, base and funnel), tamping rod (12 inches long, 3/8-inch diameter with hemispherical ends) tamping rod (24 inches long, 5/8-inch diameter with hemispherical ends), 12-inch ruler, Forney air meter (complete set) or equivalent, two (2) concrete thermometers, sponge, long-handled round scrub brush, rubber or rawhide mallet (2.25 lb. +/- 0.50 lb.), pointed trowel, five-gallon plastic bucket, concrete cylinder curing items in accordance with this project's applicable governing Specifications.
- Two (2) electronic Smart levels (4 or 6 feet long).
- Two (2) measuring wheels, with a minimum 15-inch diameter
- Two (2) 100-foot cloth tape measures
- One (1) 150-foot steel tape measure
- Ten (10) six-foot folding wood rules
- Two (2) asphalt thermometers
- One (1) digital infrared thermometer

**105.19 Maintenance During Construction.**

THE THIRD PARAGRAPH IS CHANGED TO:

Any damage to the Roadway due to the Contractor's operations shall be repaired at no Additional Compensation, except as specified in Subsection 107.22. The Contractor shall complete within 24 hours specific repairs directed by the Department, except where the requirements are specified by a Subsection. Nothing in this Subsection shall be construed to limit or change the risks assumed by the Contractor as specified in Subsection 107.22.

THE SIXTH PARAGRAPHS IS CHANGED TO:

The Department may direct the Contractor to construct Bituminous Concrete Patch as specified in Section 402 to maintain sections of traveled way and shoulders in a smooth riding condition at all times including seasonal shutdowns. Payment for Bituminous Concrete Patch will be made as specified in Section 402 except for those areas that are damaged or created by the Contractor's operations.

## SECTION 106 – CONTROL OF MATERIAL

**106.03 Materials, Inspections, Tests, and Samples.**
THE SUBSECTION HEADING IS CHANGED TO:
**106.03 Materials, Inspections, Tests, Samples and Certified Training.**

**B. Sampling and Field Testing of Soil Aggregates.**
THIS SIXTH PARAGRAPH IS CHANGED TO:

Sampling and testing of aggregates by the Department that meet the Specifications and are used in the Work will be performed without cost to the Contractor.

THE FOLLOWING SUBPART IS ADDED:

**D. Sharing of Pay-Adjustments for Portland Cement Concrete.** Positive and negative pay-adjustments, as defined in Subsection 914.02, Subpart E**,** are awarded to encourage high quality construction and, when necessary, to recoup the anticipated extra costs to the Department resulting from poor quality construction. The manner in which positive and negative pay-adjustments are to be shared by the prime Contractor and Subcontractors or Producers is to be negotiated by the affected parties. A letter signed by both parties, stating that an agreement has been reached between the parties shall be provided to the Engineer before commencement of Work. Nothing contained herein shall create right of action either in law or equity against the Department.

**106.06 Materials Field Laboratory**
THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

The Contractor shall annually pay all fees necessary to procure and maintain a Uniform Code Type Four Fire Permit according to regulations of the New Jersey Department of Community Affairs. Additional information concerning the permit fees and processing of the application may be obtained by contacting the Bureau of Materials.

**1. Laboratory.**
b.
THE FOLLOWING IS ADDED:

(19) Hands-Free headset

**1. Laboratory.**
z.
THE FIRST SENTENCE OF SUBPART Z. IS CHANGED TO:

Equipment and test apparatus conforming to that listed in AASHTO T 310 when the Pay Item "Nuclear Density Gauge" appears in the Proposal.

**1. Laboratory.**
z.
SUBPART (1) IS CHANGED TO:

(1) Conformance to AASHTO T 310,
THE LAST SEVEN PARAGRAPHS ARE CHANGED TO:

Setting up the materials field laboratory shall consist of furnishing the laboratory and enclosure complete with furniture, equipment, electricity, water, heating, air-conditioning, installation and activation of telephone lines, telephone sets (touch tone and cellular), pager units, sanitary facilities, and lavatory supplies.

Maintenance of the materials field laboratory, for the time required, shall consist of maintaining the furniture, equipment, and utilities which includes the cost of telephone fixed monthly service charges, cellular phone fixed monthly service charges for the plan specified and pager services, providing lavatory supplies, janitorial and waste disposal services weekly, restocking of the first aid box, and snow removal services. Maintenance of the materials field laboratory shall also include monthly rent.

Payment for nuclear density gauge will be made by the number of units supplied.

Payment for setting up the materials field laboratory will be made by the number of units.

Payment for the maintenance of the materials field laboratory will be made for each month or fraction thereof that the materials field laboratory is required, except that payment will not be made for any month or fraction thereof in which the Contractor is assessed liquidated damages according to Subsection 108.16.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| NUCLEAR DENSITY GAUGE | UNIT |
| MATERIALS FIELD LABORATORY SET-UP | UNIT |
| MATERIALS FIELD LABORATORY MAINTENANCE | MONTH |

Payment for telephone service will be made according to Subsection 105.15.

**106.09 Storage and Handling of Materials.**
THE ENTIRE TEXT IS CHANGED TO:

Materials shall be stored to ensure the preservation of their quality and fitness. Stored materials, even though approved before storage, may again be inspected before their use on the Project. Stored materials shall be located so as to facilitate their prompt inspection. With the approval of the Department, portions of the ROW may be used for storage purposes and for the placing of the Contractor's plant and equipment, but any additional space must be provided by the Contractor at the Contractor's expense. Equipment and materials shall be placed behind barriers or crash cushions, or stored more than 30 feet from the traveled way. The barriers and crash cushions must be approved before installation. Furnishing, placing, and removing the barriers and crash cushions shall be at no Additional Compensation. No materials shall be stored within restricted areas noted on the plans. No materials shall be stored within 10 feet, plus the extended boom length of the largest crane on site, of overhead high voltage

power lines. The high voltage power line is defined as an aerial power line having a voltage differential in excess of 750 volts between any pairs of conductors or between any conductor and ground. The Contractor shall be responsible for any power outage or de-energization associated with the Contractor's activity in the vicinity of the power lines. Private property shall not be used for storage purposes without written permission of the owner or lessee, and any other approvals, including those as specified in Subsection 107.05. Copies of such written permission shall be furnished to the Resident Engineer before storage. Storage sites shall be restored to their original condition at no Additional Compensation.

## SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

**107.01 Legal Jurisdiction.**
THE ENTIRE SUBSECTION IS CHANGED TO:

1. **Applicable Law.** This Contract shall be construed and shall be governed according to the Constitution and laws of this State.
2. **Sovereign Immunity.** The State by entering into this Contract does not waive its Sovereign Immunity, except as provided by the New Jersey Contractual Liability Act, NJSA 59:13-1 *et seq.* The rights or benefits provided the Contractor in this Contract which exceed those provided under the Act are contractual in nature and shall not be deemed to expand the waiver of Sovereign Immunity as set forth in that Act.
3. **Litigation of Claims by Contractor.** The Contractual Claims Resolution Process is not an administrative procedure but is contractual in nature, intended to review properly filed and documented claims. Pursuant to N.J.C.A. 16:45-1.3, exhaustion of the Claims Resolution Process as set forth under the Specifications is not a prerequisite to the filing of a legal action against the Department or State. The Contractor, however, must fully comply with all of the terms and conditions of the Contractual Liability Act, N.J.S.A. 59:13-1 *et seq*. prior to commencing a legal action. Therefore, where a Contractor brings a legal action, arising out of a Contract, against the Department or State or any officials or employees, thereof, arising out of or related, directly or indirectly, to a claim pending against the Department; the Contractual Claims Resolution Process, at any step, shall terminate as to that claim(s) or related claims being litigated, no matter which level of review the claim may be at when the legal action is filed. Furthermore, once the Contractor files a legal action any claim(s), related to that legal action will no longer qualify to be reviewed by the Claims Committee or to have the same claim(s) resolved under the Non-Binding Mediation Procedure or at any other Level of review. Such claim(s) will, thereafter, be resolved under the legal action subject to the provisions of the Contractual Liability Act, N.J.S.A. 59:13-1 *et seq*. unless and until the legal action is dismissed with or without prejudice. The Contractor may submit to the Department for processing through the various steps of the Contractual Claims Resolution Process any claims that are unrelated to the pending litigation subject to the terms of the Specifications and the Contractual Liability Act N.J.S.A. 59:13-1 *et seq*.
4. **Completion of the Contract.** The Completion of the Contract shall control as to any issue that may arise regarding the particular point in time when a Contractor may be barred from recovering against the State as provided under N.J.S.A. 59:13-5 *et seq*. The Contractual Claims Resolution Process and the various steps thereof may continue beyond the Completion of the Contract; however, the Contractual Claims Resolution Process will not in any manner, expressed or implied, extend any statute of limitation that may apply as to a claim. The Contractor by entering into the Contract with the Department agrees no further notice to the Contractor regarding the provisions stated in this Section are required. The Contractor also agrees to be responsible for compliance with all statutes of limitation and compliance with the various provisions of the Contractual Liability Act, N.J.S.A. 59:13-1 *et seq*.
5. **Subcontractor(s).** Pursuant to Subsection 108.02, the Department will not process or review any claims submitted by a subcontractor(s) or supplier(s) at any tier. All claims submitted by the Contractor must be an obligation or liability of the Contractor and cannot be merely a pass through of a claim by a subcontractor or by a supplier.

**107.02 Notice of Potential Claim and the Administrative Process for the Resolution of Contract Disputes.**
THE HEADING AND THE ENTIRE SUBSECTION IS CHANGED TO:

**107.02 Notice of Claim and the Contractual Claim Resolution Process.**

1. **Notice.**
   a. **Obligations.** The various notice provisions set forth in this Contract are contractual obligations assumed by the Contractor by the act of executing the Contract. The Contractor shall be responsible to notify the Department in writing within the time frame as may be mandated in an applicable Subsection of the Specifications as well as within 90 days of any situation or occurrence which may potentially result in or be the basis of a belief that additional compensation or an extension of time is due from the State, except where permission to file a "late notice of claim" has been obtained by the Contractor from the Superior Court in accordance with N.J.S.A. 59:13-6. The Department is not authorized to expand, reduce or waive either the contractual or statutory time limitations within which a notice of claim is to be filed with the Department. Any required notice shall be given only on the Contractual Notice Form provided by the Department. Submission of a Contractual Notice Form is required in order to comply with the notice requirements of the New Jersey Contractual Liability Act, N.J.S.A. 59:13-5 *et seq.,* provided such notices are given within the time limits established by that Act. The Contractor, by executing the Contract, agrees that the only evidence of compliance with the notice provisions of the Contractual Liability Act, N.J.S.A. 59:13-5 *et seq.,* and the Specifications shall be the filing of a fully completed (except that the amount of the claim need not be stated when unknown) Contractual Notice Form with the Department, and that no other documents sent or delivered to the Department or any of its officers or employees shall satisfy the statutory and/or contractual notice requirements.
   b. **Time.** The Contractor, by the act of executing the Contract, acknowledges that it will be forever barred from recovering against the State if it fails to give timely notice in accordance with N.J.S.A. 59:13-5 *et seq.,* on the Contractual Notice Form required under this Subsection of any happening of an event, thing, or occurrence or of an act or failure to act, by the Department and that the Contractor is solely responsible for complying with the various notice requirements and the timeliness of a claim as set forth under the Contractual Liability Act, N.J.S.A. 59:13-5 *et seq*. and the Specifications.
   c. **Notice Form.** The Contractual Notice Form shall be completed in its entirety for each and every claim and shall be signed by an authorized representative of the Contractor. Any Contractual Notice Form filed which does not provide all of the minimum information listed in this Subsection will be considered incomplete for the purpose of processing the claim under the Contractual Claim Resolution Process and no formal discussions or meetings concerning a claim filed on an incomplete Form will take place. A Contractual Notice Form which identifies the amount of the claim as being unknown may be considered by the Department as only satisfying the notice requirements as set forth under the Contractual Liability Act, N.J.S.A. 59:13-5 et seq., as long as the notice of claim is timely filed and provides all of the other minimum information on or attached to a properly executed Contractual Notice Form. However, for any claim requesting Additional Compensation, it shall not be sufficient to begin the Claim Resolution Process until the exact amount is provided according to 3.j. below. The Contractor's act of executing the Contract shall be construed to be an acknowledgment by the Contractor that it understands that the processing of a claim by the Department at any step of the Contractual Claims Resolution Process shall not constitute a waiver by the State of any defense that a claim was filed out of time and is thereby barred under the terms of the Contractual Liability Act or of any defense that there is no merit to the "claim being asserted by the Contractor".
2. **Steps of Review.** The Contractual Claim Resolution Process is sequential in nature and is composed of the following steps:

   Step I: Review by the Resident Engineer;
   Step II: Review by the Regional Dispute Board;
   Step III: Review by the Department Claims Committee;
   Step IV: Non-Binding Mediation.

   Processing through the steps is subject to the following conditions:

   a. No claim will be accorded a particular level of review unless and until the claim has been reviewed at the preceding step. Additionally, there will be no further review of the claim, unless and until the Contractor provides, in writing, that the decision of a review step within the specified timeframe is unacceptable and further requests that the claim be forwarded to the next step. Absent the written submittal of this information the claim will be considered withdrawn from the Contractual Claim

Resolution Process. If at any step in the process, a claim is resolved, the Contractor must sign an unconditional release, furnished by the Department, as to any and all matters arising from the claim.

b. In order to begin the Contractual Claim Resolution Process the Contractor must state in writing that all documentation in support of the claim, as required under this Subsection, has been provided to the Department as part of or attached to the contractually required Contractual Notice Form and that the Contractor has requested that the review process, as outlined above, begin. The Resident Engineer will take no formal action until this notification is received and the Resident Engineer independently determines that the Contractor has in fact satisfied the requirements of this Subsection. If the documentation submitted by the Contractor is determined to be incomplete, the Resident Engineer will notify the Contractor that the review process cannot begin and include a list of missing components required to start the process. When the additional material is submitted, the Contractor is required to again notify the Resident Engineer in writing that all documentation in support of the claim has been provided and the Contractual Claim Resolution Process should begin. The Contractor shall be limited to the documentation provided to the Resident Engineer at the beginning of Step I, in support of a claim, throughout all steps of the Claim Resolution Process. The submission of additional information by the Contractor at any step beyond Step I, shall be cause for the claim to revert back to Step I for review at each and every Step. The Resident Engineer will provide written notice to the Contractor when Step I was begun.

c. When the value of the claim submitted by the Contractor is $20,000 or less, the Step II review will be the final step in the Contractual Claim Resolution Process. In such a case, the decision of the Regional Dispute Board will be final and there will be no further contractual review.

d. Where there has been a determination, at both Step I and Step II, that the specifications do not provide a contractual basis for the resolution of the claim submitted by the Contractor or that the Notice of Claim was filed late without obtaining permission of the Superior Court, the Department reserves the right to conclude the Contractual Claim Resolution Process at the end of the Step II review. In such instance, the Secretary of the Department Claims Committee will provide the Contractor with the reason(s) for the no further review determination and rejection of the claim. However, where the Claims Committee does review a claim, there shall not be deemed a waiver by the Department of any defense that the Notice was filed late or that there does not exists a contractual basis for resolution.

**3. Information Required.** As a minimum, all of the following information must accompany each claim and be incorporated into or attached to the contractually required Contractual Notice Form:

a. A detailed factual statement of the claim providing all necessary dates, locations, and items of work affected by the claim.

b. The date on which facts arose that gave rise to the claim.

c. A copy of any notice given to the Department pursuant to any other Subsection of the Contract which relates to the matter giving rise to the claim.

d. The name, function, and activity of each State individual, official, or employee involved in or knowledgeable about the claim.

e. The specific provisions of the Contract which support or mitigate against the claim and a statement of the reasons why such provisions support or mitigate against the claim.

f. If the claim relates to a decision of the Department which the Contract leaves to the Department's discretion or as to which the Contract provides that the Department's decision is final, the Contractor shall set out in detail all facts supporting its contention that the decision of the Department was fraudulent, arbitrary or capricious.

g. The identification of any documents and the substance of any oral communications relating to such claim attaching same to the Form.

h. A statement as to whether the additional compensation or extension of contract time sought is based on the operation of the provisions of the Contract or an alleged breach of contract.

i. If an extension of contract time is sought, the specific days sought and the basis for such claim, supported by the Contractor’s approved baseline progress schedule and updates, as well as a fragment, which will include a time impact evaluation, depicting the delay according to Subsection 108.04.

j. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:
   (1) Direct Labor
   (2) Direct Materials

(3) Direct Overhead as specified in Subsections 109.03 and 109.04.
(4) Subcontractor's Work
(5) Other categories as specified by the Contractor.
(6) The basis and manner of the Contractor's calculations of the additional compensation claimed.

The Department will not determine liability separate and apart from damages. The Contractual Claims Resolution Process shall not be bifurcated. The Department shall review liability and damage valuation issues at the same time.

**4. The Procedures for the Process.**

**a. Step I, Resident Engineer Review.** The Resident Engineer will render a written decision regarding the claim presented within 30 State Business Days of the Resident Engineer's determination that the information provided by the Contractor on the Contractual Notice Form in support of the claim satisfied the requirements to begin Step I. This time limit may be extended by mutual agreement of the parties. Within 15 State Business Days of the receipt of the decision by the Resident Engineer, the Contractor shall either accept or reject the decision in writing; or upon failure to complete this, the claim will be considered withdrawn from the Contractual Claim Resolution Process and there will be no further review of the claim. If the Contractor accepts the decision, such acceptance shall include execution of an unconditional release furnished by the Department effective upon payment.

**b. Step II, Regional Dispute Board Review.** If the Contractor provides a written rejection of the Resident Engineer's decision and a request to forward the claim to Step II, the Resident Engineer will forward the claim and supporting information previously submitted by the Contractor to the Regional Dispute Board within five State Business Days. The Regional Dispute Board will schedule and hold a meeting to review the claim with the Contractor within 30 State Business Days of receipt of the said claim information from the Resident Engineer. This time limit may be extended by mutual agreement of the parties. The Regional Dispute Board will issue a written decision regarding the claim within 20 State Business Days of the meeting.

Within 15 State Business Days of receipt of the Regional Dispute Board decision, the Contractor shall either accept or reject it in writing; or upon failure to complete this, the claim will be considered withdrawn and the Contractual Claim Resolution Process shall be considered to be concluded for that particular claim. If the Contractor accepts the decision, such acceptance shall include execution of an unconditional release furnished by the Department effective upon payment.

The Director, Construction Services and Materials, may request an informal meeting with the Contractor to discuss the then pending claim(s) after the Step II decision has been issued and sent to the Contractor, but prior to the matter being reviewed at the next step, subject to the mutual consent of the Contractor and the Department.

**c. Step III, Claims Committee Review**. A written request for a Step III review of the claim is to be made to the Secretary of the Department Claims Committee, P.O. Box 600, Trenton, New Jersey 08625-0600 with a copy to the Director, Construction Services & Materials. The Contractor may request that the Department Claims Committee immediately review claims, which are unresolved after review by the Regional Dispute Board,, when the following conditions are met:

1. A claim or the combination of claims exceed $250,000; or
2. It is mutually agreed to by the Contractor and the Department.

However, when a project becomes 75 percent complete by contract time or dollar amount, which ever first occurs, claims that are unresolved at Step II will be reviewed at a single session of the Department Claims Committee after the Completion of the Work.

Additionally, the Contractor may request at the time of issuance of the Final Certificate that all unresolved claims, with the exception of the exclusionary cases as provided for in this Subsection, that have gone through the Steps I and II of the Contractual Claim Resolution Process, and which have not been presented at Step III of the Contractual Claim Resolution Process, be reviewed by the Department Claims Committee as provided for in this Subsection. The Contractor's written request must accompany its exceptions to the Final Certificate, with a copy sent to the Secretary of the Department Claims Committee and shall be made no later than 30 State Business Days after the issuance of the Final Certificate.

The Secretary of the Department Claims Committee will schedule a Claims Committee meeting with representatives of the Contractor and the Region, to be held within 45 State Business Days of the receipt of the claim information. This time limit may be extended by mutual agreement of the parties. The Department Claims Committee will notify the Contractor in writing of its decision on the claim(s) within 45 State Business Days of the meeting, stipulating the terms of any

resolution of the claims. If the Department Claims Committee determines after review of the claims that no resolution and no further payment is warranted, it shall notify the Contractor in writing of its decision. Within 15 State Business Days of the receipt of the Department Claims Committee decision, the Contractor shall either accept or reject it in writing, or upon failure to complete this, the claim will be considered withdrawn and the Contractual Claim Resolution Process shall be considered to be concluded for that particular claim. If the Contractor accepts the decision, such acceptance shall include execution of an unconditional release furnished by the Department effective upon payment. If the Contractor rejects the decision, there will be no further review of the claim unless the Contractor submits a written request for the utilization of Non-Binding Mediation.

**d. Step IV, Non-Binding Mediation.**

**(1) Conditions**. The Contractor may request at any time during the Project, but no later than 30 State Business Days after issuance of the Final Certificate, that any claim unresolved by the Department Claims Committee be elevated to Step IV. The request must be in writing to the Secretary, Department Claims Committee, P.O. Box 600, Trenton, New Jersey 08625-0600. No claim will be elevated to Step IV unless all of the following conditions are satisfied:

(a.) The claim has been reviewed by the Department Claims Committee.

(b.) The Contractor has escrowed its bid preparation documents as required under Subsection 103.06 and the documents are still being held in escrow.

(c.) The Contractor has entered into a Non-Evidential agreement to the effect that any statement or information provided during the Non-Binding Mediation proceedings shall not be evidential in any legal proceeding unless obtained by other discoverable means.

(d.) The Contractor has entered into a cost sharing agreement to equally share the cost of using Non-Binding Mediation in accord with Department issued forms.

(e.) The utilization of Non-Binding Mediation has been mutually agreed to by the Department and the Contractor; and

(f.) Prior to the commencement of the Non-Binding Mediation the parties shall confer with one another for the purpose of resolving the format of presenting the claim summary, supporting information, opening statements, and responses.

Failure by the Contractor to request Non-Binding Mediation within the required time period shall constitute a waiver by the Contractor of any utilization of the Non-Binding Mediation Step.

**(2) Forms**. Where the Contractor requests that Non-Binding Mediation be conducted, the Department will forward to the Contractor the required Non–Evidential and cost sharing agreement forms which shall be executed by the Contractor and returned to the Department within ten State Business Days. The failure by the Contractor to return the fully executed Non-Evidential and cost sharing agreements to the Department within the ten-day period shall constitute a waiver by the Contractor of the availability of Step IV.

**(3) Mediator**. The Department will select the Mediator to be utilized for the Non-Binding Mediation from a list of candidates submitted by the Contractor. The Contractor shall submit the names of six proposed Mediators, along with a biographical background listing the experience and qualifications of each candidate. Candidates may be from the same employment category or disciplines, such as construction, mediation, partnering facilitation, consulting engineer, attorney, judiciary (retired), accountant, architect, etc.

A candidate may have been used for mediation purposes for this Project or another project but shall not have any other relationships with either the Department or the Contractor for a period of two years preceding the request for Step IV. If the Department determines that none of the candidates submitted are acceptable, the Department will request and the Contractor shall submit four additional Mediator candidates. The Contractor shall submit this additional list within five State Business Days of the receipt of the written request. Upon mutual agreement, the Mediator can be an individual proposed by the Department.

**(4) Escrow Documents.** Once the Contractor has fully executed the required Non-Evidential and cost sharing agreements, its escrowed bid documents will be released upon request of the Department Claims Committee Chairperson solely for the exclusive use of the Mediator, the Department's selected Negotiator(s), the Department Regional Representative(s) and the Contractor Representative(s) participating in the Mediation session. These documents will be used by the Department as part of the Contractual Claims Resolution Process only to resolve

the pending claims except it may seek such documents through the discovery process in the event mediation is not successful and litigation ensues.

**(5) Meeting.** The Secretary of the Department Claims Committee will schedule a meeting for the Non-Binding Mediation of the submitted claims to be held within 30 State Business Days of the return of the executed Non-Evidential and cost sharing agreements. The meeting time limit may be extended by mutual agreement of the parties. The Secretary of the Department Claims Committee will issue the recommendations of the Department's Negotiator to the Commissioner for action within 15 State Business Days of the Non Binding Mediation session. The Commissioner, or their designee, will accept, reject, or modify the recommendation of the Department Negotiator and notify the Contractor of the decision within 15 State Business Days.

**(6) Decision.** The Contractor shall accept or reject the decision within 15 State Business Days of notification of the Commissioner's decision. If the Contractor accepts the decision of the Commissioner, or their designee, such acceptance shall be in writing and include execution of an unconditional release furnished by the Department effective upon payment. If the Contractor fails to accept or reject the Commissioner's decision within 15 State Business Days, the decision of the Commissioner will be withdrawn and the Contractual Claims Resolution Process shall be deemed concluded as to that particular claim under review.

After submission of the recommendation to the Commissioner, the bid documents released from escrow will be returned to the escrow agent for continued escrow in the designated repository.

**107.05 Permits, Licenses, and taxes.**

THE FOLLOWING IS ADDED TO THIS SECTION:

The contractor shall allow authorized representatives from all permitting agencies to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms of the permit.

The contractor shall survey the channel for a width of one hundred fifty (150) feet centered on the proposed channel and five hundred (500) feet both upstream and downstream of the bridge as well as under the bridge prior to beginning any operations and shall also survey the channel after all work is completed to provide the required documentation to the Coast Guard that the channel has not been fouled by the construction. The contractor shall also survey the public access platform within 60 days of completion of the platform. The survey of the public access platform shall be conducted by a licensed surveyor and shall show the elevations and alignment of the access platform with any discrepancies clearly noted. The U.S. Coast Guard will require certification in writing by a licensed Engineer, licensed Surveyor or responsible official of the contractor that the waterway has not been impaired and all construction related debris has been cleared from the same. The Coast Guard recommends that a bar sweep (wire drag) be used as a method of determining that the channel is cleared of debris. The contractor's certification shall include the actual method used to conduct the survey. The contractor shall remove any debris, resulting from the current or prior work or occurrences, discovered during this survey. Dredging of the waterway is not required for changes due to natural riverbed siltation. The Contractor shall verify the channel depth and inform the engineer if the channel depth has changed due to the construction. The Corps of Engineers will require certification in writing, including the survey by the licensed surveyor, that the public access platform has been installed in compliance with the approved plan.

A responsible official of the contractor shall verify the as-built clearances from the mean high water line and a statement attesting to the correctness of the clearances shall be forwarded to the NJDOT and the Coast Guard office for record purposes. In lieu of verification by the above listed official, certification by a licensed Surveyor or a registered Professional Engineer registered in the state of New Jersey.

It shall be the contractor's responsibility to ensure that the waterway depths are not affected by this work. Should it be suspected that waterway depths have been impaired or that an obstruction resulting from the work may exist, the contractor, upon request of the Coast Guard or Corps of Engineers, provide the necessary equipment and personnel to undertake a survey to determine the presence of such impairment or obstruction. The cost of this work shall be the responsibility of the contractor and included in the price bid for the item "Channel Survey".

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| CHANNEL SURVEY | LUMP SUM |

Fifty percent of the price bid (or $9,500.00, whichever is less) will be paid upon acceptance of the survey prior to beginning construction.

The remaining price bid will be paid upon acceptance of the surveys and certifications after completion of construction.

**107.11 Public Convenience and Safety.**

THE FOLLOWING IS ADDED:

The Contractor shall not park any construction vehicles or equipment on residential and local streets.

**107.13 Construction Over or Adjacent to Navigable Waters.**

THE FOLLOWING IS ADDED TO THE BEGINNING OF THIS SUBSECTION:

State forces shall operate the existing bridge during the construction stages in which the existing bridge is open to vehicular and pedestrian traffic.

THE FOLLOWING IS ADDED:

a. One copy of the Contractor's plan and sequence of operations, approved by the Engineer shall be submitted to the U.S. Coast Guard office for approval, preferably 30, but at least 14 days prior to any work over or in the waterway. In addition, a sketch of the project area shall be submitted showing: 1) the waterway, 2) the bridge, 3) the location of any restriction that will be placed in the waterway such as barges, anchors, and anchor lines, falsework, cofferdams or other obstructions, and 4) the location height above mean high water and detailed description of any scaffolding or netting to be used. The schedule shall also include the daily hours of operation and indicate whether waterborne equipment will remain in the waterway at night. The Contractor will be required to comply with all provisions of the Navigation Rules International - Inland, copies of which are available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Pittsburgh, PA 15250. Refer to stock No. 050-012-00376-9. No deviation from the approved plan and schedule of operations may be made unless the modification has previously been submitted and approved.

b. At no time during the construction will the waterway be closed to navigation without prior written notification and approval of the Coast Guard. All waterway closures or restrictions shall be requested in writing to be received at the U.S. Coast Guard Office at least 14 days in advance. This written request shall include the location of the work, a description of the construction activities, the type of construction equipment to be used and expected duration of work in the waterway. At the same time, waterway closings shall be coordinated with the harbormasters of the local marinas so as to minimize the impact on commercial fishing and party boats. Written confirmation of the coordination shall be received by the Resident Engineer at least 14 days in advance of the closings. The written notification shall specifically include the following:

Crystal Point Yacht Club
4000 River road
Point Pleasant, NJ
732-892-8300
Contact: Tom DeLotto, General Manager

Manasquan River Club
217 Riverside Drive
Brick, NJ 08724
732-840-0300
Contact: Tom DeLotto, General Manager

Marine Max Mid-Atlantic L.P.
1500 Riverside Drive
Bricktown, NJ 08724
732-840-2100
Web Site: www.marinemax.com
E-mail: info@marinemax.com
Contact: Erick Haug

Lighting Jack's
Boat Sales & Marina
809 Rt. 70 East
Brick, NJ 08723
732-458-2016
Contact: John Woolley

McCarthy's Marine Sales
1029 Rt. 70 & River Road
Brielle, NJ 08730
732-528-8200
Contact: Ed McCarthy

Vita & Becht II LLC
1600 Rt 70
Brick, NJ

c. Positive means shall be taken to prevent any hot work, debris or construction material from entering the waterway. Debris in the waterway and/or wetlands shall be removed immediately. This includes sandblasting material, paint and any concrete work by-products. If welding or burning is to take place, some type of flameproof material shall be the uppermost protective containment material. All welding and burning shall cease upon approach of a vessel and shall not start again until the vessel is past the bridge. An observer or observers shall be stationed so as to have unimpeded view of both upstream and downstream access to the waterway area thereby assuring that all workmen can be alerted of a vessel's approach by appropriate, mechanical means, such as an air horn.

d. Instead of netting and because of the possibility of high winds, structural members may be secured to the work platform so as to project upward, with netting, canvas or other protective material securely attached. After work hours, the scaffold shall be drawn up under the span or removed so vertical clearance is not reduced. If this is not possible, then synchronized quick-flashing red lights must be mounted on each of the four lower corners. During daylight hours, warning signs for a 3-mile range shall mark the location of the work platforms. The signs shall face upstream and downstream so as to draw the mariner's attention to the fact that the clearance has been reduced. These requirements also apply when scaffolding is suspended under other portions of the bridge over the waterway. A canvas dodger or netting shall be attached to the scaffold guardrail to prevent objects from bouncing off the deck into the waterway.

e. Floating equipment shall have a radiotelephone capable of operation from its main control station in accordance with Part 26 Title 33, Code of Federal Regulations and shall be monitored during all periods when the floating equipment is on station.

f. All construction equipment placed in the waterway shall be lighted in accordance with the provisions outlined in the Navigation Rules International – Inland.

g. Floating work equipment (barges, etc.) must be moved out of the navigable channel during darkness after work-hours. The U.S. Coast Guard must be notified at least two weeks in advance for approval of placement of the equipment in the channel. If barges are used and held in place by anchors it shall be oriented so as to minimize reduction of the horizontal clearance, all anchor lines must be marked by anchor buoys which should be lighted.

h. Work shall be performed in such a manner so as not to present any metal surfaces on the face of the fender system. All bolts or other metal fastening devices shall be countersunk so that bolt heads are recessed at least one inch from the face of the fender system. Spikes shall be driven so that outer heads are recessed one-quarter ($^1/_4$) inch. Metal splicing plates, if used, shall be mounted on back of outer wales or set back 2 inches from the fender face if mounted on top or bottom of outer wales. This will allow for wear and will minimize the chance for vessel contact with metal fasteners.

i. All piles of the existing fender system shall be extracted rather than cut off at the mud line.

j. If permanent navigational lighting cannot be maintained operable, identical temporary battery or power-operated lights shall be installed at the same locations. These temporary lights shall be visible for a distance of 2,000 yards on 90% of the nights of the year. Generally, a lamp of 20 foot-candles will meet these requirements. The temporary lights shall be in place until the repairs have been completed or permanent navigational lighting has been installed and determined to be operating satisfactorily. Plans for temporary lighting (if used) during periods of construction shall be submitted to the United States Coast Guard for written approval. If temporary lights are not installed in the same locations as permanent lights, specific information regarding proposed locations compared to the permanent position shall be provided. Deviations from the approved temporary lighting shall be permitted only upon written authorization from the Engineer.

k. During the progress of work, should any material, machinery or equipment be lost, dumped, thrown overboard, or sunk so as to obstruct, interfere with or hazard navigation, immediate notice shall be given to the Coast Guard and the object removed as soon as possible. Until removal can be effected, the obstruction shall be properly marked in order to protect navigation. Notice to the Coast Guard shall give a description and location of any such object and the action taken or being taken to protect navigation and of action to remove the obstruction.

l. Spillage of oil and hazardous substances is specifically prohibited by Section 311 of the Clean Water Control, as amended. Measures should be taken including: (1) proper maintenance of construction equipment, (2) arrangement of fuel/hazardous substances handling areas so as to ensure that any spills are contained before reaching navigable waterways or their adjoining shorelines, (3) instructions to personnel not to dispose of hazardous substances into drains or the navigable waterways directly or onto adjoining shorelines and (4) other procedures to prevent spillage. If in spite of such planning oil/hazardous substances are spilled into a navigable waterway or adjoining shoreline, the U.S. Coast Guard is to be notified immediately at 800-424-8802. A supply of an absorbent material shall be retained so that it may be rapidly deployed to soak up any spillage, pending Coast Guard arrival on the scene. The use of chemical dispersing agents and emulsifiers is not authorized without prior, specific, Federal approval.

m. All material removed from the waterway for the placement of the bridge piers shall be rehandled in an upland, non-wetland area.

n. The fill material behind the new wingwalls on the western side of the bridge and the fill associated with the five bridge piers shall be free of oil and grease, debris, wood, general refuse, plaster, and other pollutants, and shall contain no broken asphalt.

**107.22 Risks Assumed by the Contractor**
SUBPART 1 IS CHANGED TO:

1. **Risks of Loss or Damage to the Permanent Construction**. Until Acceptance, and within the limits of the Project's work, the Contractor shall bear the risk of all loss or damage to all permanent construction and temporary construction performed under this Contract and to materials, whether or not it has received payment for such construction or materials under Subsection 109.05, 109.06, or 109.07, except payment will be made to the Contractor for the repair or replacement of any permanent element of the construction which has not been accepted by the Department, if the element of the work damaged is completed to the stage of serving its intended function and is subsequently damaged by accident by public traffic. In order to receive payment, the Contractor must supply satisfactory evidence that such damage was caused by a public traffic accident which was not caused by vandalism or by the equipment of the Contractor or any of its subcontractors or suppliers. Satisfactory evidence shall generally be limited to: accident reports

filed with the Division of Motor Vehicles, police agencies or insurance companies; statements by reliable, unbiased eye witnesses; identification of the vehicle involved in the accident. Physical evidence that the damage was caused by a motor vehicle (such as tire marks or broken headlight glass) will not be sufficient unless it can be clearly shown that the damage was not caused by the Contractor's vehicles or by vandalism. The Contractor shall take every precaution, as allowed by the Contract against injury or damage to any part of the construction or to materials by the action of the elements, the traveling public, vandalism, or from any other cause, whether arising from the execution or the non-execution of the work. The Contractor shall promptly repair, replace, and make good any such damage or loss without cost to the Department. The Contractor shall not bear such risk of loss or damage, which arises from acts of war or floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes, or other cataclysmic natural phenomenon unless such loss or damage is covered by insurance.

## SECTION 108 - PROSECUTION AND PROGRESS

**108.02 Subcontracting.**

Specialty Items are as listed below:

Above ground highway lighting items.
Above ground sign lighting items.
Above and below bridge deck lighting items.
Electrical wire items.
Emergency Backup Generator
Post-tensioning systems

THE FOLLOWING IS ADDED TO THE END OF THE FIFTH PARAGRAPH:

The Contractor shall also attach to that form (application for subcontracting form) proof of the Subcontractor's valid, current registration with the New Jersey Department of Labor, Division of Wage and Hour Compliance as required by "Public Works Contractor Registration Act," N.J.S.A. 34:11-56.48 et seq. (P.L. 2003, c. 91). Pursuant to P.L. 2003, c. 91, the Department will not consent to the proposed subcontracting, and the Subcontractor shall not perform any work under the Contract, unless the Contractor first provides the required proof of the Subcontractor's valid, current registration with the New Jersey Department of Labor, Division of Wage and Hour Compliance as required by "Public Works Contractor Registration Act." The Contractor shall ensure full compliance with the Public Works Contractor Registration requirements by their Subcontractors.

**108.03 Commencement of Work.**

THE THIRD SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Construction operations shall not begin until the Contractor has supplied, and the Engineer has accepted, the preliminary schedule and other certifications, forms, schedules, and any other information required by the Contract Documents, and until the Contractor has established a field office as required by Subsection 105.15.

**108.04 Progress Schedule and Prosecution of the Work.**

THE ENTIRE SUBSECTION IS CHANGED TO:

In scheduling and executing the Work, the following shall be complied with:

1. **Progress Schedules.** The progress schedule shall conform to and incorporate the following requirements:
   a. **General.**
      (1) The work shall be monitored by a detailed CPM schedule. The CPM schedule shall be developed utilizing the most current NJDOT Capital Program Management Construction Scheduling Standard Coding and Procedures for Designers and Contractors Manual and the NJDOT Primavera template project containing the latest standard coding. The manual and template are available from the Bureau of Quality Management Services.

The CPM schedule shall consist of diagrams and accompanying mathematical analyses. The scheduling of submittals, procurement, construction, and all else necessary to complete the Work as described in the Contract Documents, is the responsibility of the Contractor. The requirement for the CPM schedule is included to ensure adequate planning and execution of the Work and to assist the Department in appraising the reasonableness of the proposed schedule, as well as its compliance with Contract requirements.

The CPM schedule is the Contractor's committed plan to complete all work within the allotted time. The Contractor assumes full responsibility for the prosecution of the Work as shown. The CPM schedule shall be based on and derived from detailed schedules used to complete all Contract activities.

(2) No claim for extension of time due to extra work or any other type of delay will be considered unless the baseline schedule has been approved and monthly updates are current and submitted within the time limits stated.

(3) No claim for additional compensation as specified in Subsection 109.04 will be considered unless the baseline schedule has been approved and monthly updates are current and submitted within the time limits stated.

(4) The CPM preliminary, baseline, and updated schedules shall be submitted in electronic format on a floppy diskette or compact disk, in addition to the required number of copies specified in b. (1) and b. (2) below.

(5) Once the CPM baseline schedule has been approved, the Contractor shall not deviate therefrom without first notifying the Engineer in writing and schedule is updated in accordance with 1.h. and 1.i. below.

**b. Submittals.** The CPM schedule shall consist of the following two distinct initial submittals:

(1) **Preliminary Schedule.** No later than 10 State Business Days after execution of the Contract, the Contractor shall submit to the Engineer for review and approval or rejection and return a preliminary schedule. The contractor shall submit six copies of:

(a) A CPM time-scaled diagram defining the Contractor's planned activities during the first 90 Calendar Days. For projects with a construction cost over $ 40 million, a CPM time-scaled diagram defining the Contractor's planned activities during the first 120 Calendar Days.

(b) A summary network for the remainder of the Contract time. The preliminary schedule shall indicate all milestone activities expected to be completed or partially completed before submission and approval of the CPM baseline schedule as specified in b. (2) below.

(c) All multiple shifts per day and anticipated production rates shall be detailed in the Contractor's narrative accompanying the preliminary schedule.

(d) The Work shall not begin until the preliminary schedule has been approved. Five State Business Days will be required for review and approval or rejection and return of the preliminary schedule.

(2) **Baseline CPM Schedule.** In accordance with the time frames listed below, the Contractor shall submit six copies of the Baseline CPM Schedule documents depicting the Contractor's work plan for the entire Contract.

| Project Construction Cost ($ million) | Time Frame After Approval of Preliminary Schedule for Submission of the Baseline CPM Schedule (State Business Days) |
|---|---|
| < 5 | 10 |
| 5 - 15 | 15 |
| 15 - 40 | 20 |
| > 40 | 30 |

The Contractor shall submit to the Engineer for review and approval or rejection and return:

(a) Computer generated tabular schedule and logic reports in accordance with 1.e. below.

(b) Time-scaled computer generated Layout Output in conformance with 1.f. below.

(c) A written narrative explaining the schedule and the Contractor's general approach for achieving Substantial Completion and the date of Completion as specified in Subsection

108.10 of these Special Provisions. Multiple shifts per day and anticipated production rates shall be detailed in the Contractor's narrative accompanying the Baseline CPM Schedule.

(d) Electronic version as specified in 1.a. (4) above.

**c. CPM Schedule Requirements for the Baseline and Updates.**

(1) The CPM schedule and updates shall contain the following:

(a) The order in which the Contractor proposes to prosecute the Work; the starting dates of the various work stages, operations, and principal items of work including procurement of materials and plant, and the contemplated dates for completing the same.

(b) List dates for all required submissions.

(c) A clear outline of the intended maintenance of traffic.

(d) The locations and timeframes for the installation of temporary and permanent soil erosion and sediment control measures to be installed.

(e) All unusual requirements specific to the project included in the Contract Documents or as deemed appropriate for the project.

(f) Special consideration to sensitive areas such as wetlands, floodplains, waterways, and parklands to ensure that appropriate staging and seasonal constraints are considered in order to maximize the effectiveness of the soil erosion and sediment controls.

(g) The time frames when work is restricted in sensitive areas as reflected in present and future permits as anticipated or known.

(h) Updates to reflect permit conditions if changed.

(i) Include a detailed, step-by-step outline of any clean-up operations regarding contaminated material.

(j) The work of the Contractor, subcontractors, suppliers, the Department, permitting agencies, utility companies, and all others that affect progress shall be shown and identified on the schedule by responsibility codes.

(k) Procurement activities shall be shown, including plans, permits, materials, individual working drawings, fabrication, and delivery of the material. Twenty (20) State Business Days will be required for review and certification or rejection and return of fabrication working drawings. Thirty (30) State Business Days will be required for review and approval or rejection and return of working drawings for items that were included as conceptual and the Contractor is required to complete final design plans. The time frames set forth in this paragraph are provided for scheduling purposes only. The Department reserves the right to enlarge such time periods for review by a reasonable amount of time where circumstances necessitate, within the sole discretion of the Engineer.

(l) Traffic staging, delivery of Department - furnished labor/equipment, project phasing, right-of-way availability dates, and any other requirements specified in Divisions 200 through 900 shall be shown.

(m) The CPM schedule shall contain sufficient activities to adequately depict the Work, and will be subject to the review and approval of the Engineer.

(n) The logic and activity time durations established by the Contractor shall be consistent with the Contract Documents and be reflective of proper coordination between trades.

(2) The CPM schedule shall operate as follows:

(a) The CPM schedule shall be of the precedence type.

(b) One activity for each discrete component part of each Pay Item scheduled in the Proposal. The Engineer may allow grouping of similar Pay Items into one activity. No work activity shall have a duration greater than 30 Calendar Days, except as approved by the Engineer. The activities shall be consistent with the Work Breakdown Structure (WBS), and shall also include discrete component parts of the Contractor's submittal preparation, Department approval, procurement, and construction work activities with sufficient detail such that all the relationships with all direct and non-direct parties to the Work are shown.

(c) The system shall be based upon network diagrams and accompanying mathematical tabulations as described hereinafter. Diagrams shall show the order and interdependence of activities and the sequence and quantities in which work is to be accomplished. The basic concept of network scheduling shall be followed to show how the start of a given activity is dependent on the completion of preceding activities and how its completion may affect the start of subsequent activities. The critical path shall be distinguished from other paths on the network.

(d) The completion date of the CPM schedule shall be the date of Completion specified in Subsection 108.10 of these Special Provisions, except as specified in Subsection 108.04 subpart 5, which shall be input as a Finish Milestone with a Late Finish Constraint. All Intermediate Milestones required in the Contract shall be shown in proper logical sequence and input as a "Start-no-Earlier-Than" constraint for entrance into an area or start activity or a "Finish-no-Later-Than" constraint date for completions.

(e) Activities shall be described such that the Work is readily identifiable for assessment of start and completion, as well as intermediate status. Descriptions shall utilize activity codes for physical locations at each stage such as distance-markers, structures, and elevations where possible to define the Work. Activity descriptions of "Start," "Continue," "Completion," "X percent," "Y percent," "Z percent" or similar nonspecific descriptions will not be allowed.

(f) The CPM schedule shall be calculated in Working Days. The Working Day to calendar date correlation shall be based upon the Contractors proposed work week with adequate allowance for weekends, legal holidays and any special requirements of the Contract. Activities shall indicate the calendar being used. Durations for activities shall not be less than one workday. Multiple shifts per day and anticipated production rates shall be detailed in the Contractor's narrative accompanying the baseline schedule and subsequent updates.

(g) Constraint dates are permitted only on milestone activities, unless otherwise approved by the Engineer.

(h) All activities with the exception of the Project Start Milestone and Project Completion Milestone shall have predecessors and successors. The start of an activity shall have a Start-to-Start or Finish-to-Start relationship with preceding activities. The completion of an activity shall have a Finish-to-Start or Finish-to-Finish relationship with a succeeding activity. Start-to-Finish relationships are not acceptable.

(i) CPM schedules, which have been resource leveled, are permissible, provided the effects of leveling are incorporated in the schedule using "Start-no-Earlier-Than" date constraints.

**d. Computer Program Requirements.** The computer program requirements shall be the same as that specified in Subsection 105.15 subpart 1.e. of these Special Provisions.

**e. Tabular Reports.**

(1) CPM schedule reports shall be provided for the following sort orders:

(a) Total float, then early start for activities with float less than 20 days.

(b) Grouped by responsibility, then by early start.

(c) Grouped by WBS, area, then sorted by early start.

(2) The minimum activity information required for each of the above reports in (1), shall include the following:

(a) A unique activity ID for each activity.

(b) A description of the Work represented by the activity.

(c) Location code identification.

(d) Work responsibility code identification.

(e) Original activity duration and remaining activity duration in Working Days.

(f) Early and late, start and finish dates calculated according to CPM principles.

(g) Total float.

(h) Historical (actual) dates for activities completed or underway shall replace the appropriate calculated dates.

(i) Stages.

(j) Calendar used for each activity.

**f. CPM Time-Scaled Layout Output.**

(1) The network displayed on the schedule diagram shall depict the exact detail of the CPM schedule reports.

(2) The network diagram shall be of the precedence type and drawn by using early dates.

(3) The layout output shall be time-scaled. The length of the activity representation shall be proportional to the activity duration.

(4) The activity display shall include the:

(a) Activity description.

(b) Activity identification.

(c) Activity original duration and remaining duration.

(d) Activities coded by area, responsibility, and WBS.

(e) Activity total float.
(f) Activities early start dates.
(g) Activities finish dates.
(5) The activities, which are displayed on the network diagram, shall be grouped by WBS and sorted by area. The title of these components shall appear on the left-hand side of the plot.
(6) The critical path shall be identified on the plot.
(7) Vertical lines indicating the start and the end of each month shall be shown.
(8) The data date shall be indicated on the plot in the activity display and in the title at the top or bottom of the plot.
(9) Completed activities shall be indicated on the plot.
(10) The Contract title shall be displayed on the plot.
(11) A legend shall be provided which indicates the various symbols used and their meanings.
(12) Milestone Activity shall be indicated by a prominent symbol.
(13) Different line types shall indicate the critical path and completed Milestone and activities.

**g. Review and Approval.** The Engineer will review a submitted preliminary schedule for approval or rejection within five State Business Days of receipt and will thereafter return same to the party having submitted it. There will, in turn, be allotted ten State Business Days for review and approval or rejection by the Engineer of the submitted baseline schedule, which will thereafter be returned to the party having submitted it. The Engineer will review revised preliminary or revised baseline submittals within five State Business Days of receipt. The time periods set forth in this paragraph are provided for scheduling purposes only. The Department reserves the right to enlarge such time periods for review by a reasonable amount of time where circumstances necessitate, within the sole discretion of the Engineer.

**h. Updating and Revisions.**

(1) Within ten State Business Days after review by the Engineer, all preliminary and baseline schedules that are not approved shall be revised and resubmitted by the Contractor until the Engineer's approval is received.
(2) The Contractor shall update the CPM schedule monthly whether or not the Engineer has accepted the schedule, to reflect actual activity progress. The update shall include the historical record of actual start and actual finish dates for activities in progress, or completed, and the remaining duration based on the amount of workdays required to complete the activity.
(3) Monthly progress meetings shall be held. The updated CPM schedule shall be the basis for the monthly progress review meetings. Activity progress shall be prepared in advance of the meeting. At this meeting, attended by the Engineer, all progress during the calendar month shall be presented and reviewed for incorporation into the schedule by the Contractor. Within a period of ten State Business Days from the date of this progress meeting, the Contractor shall submit the schedule update to the Engineer with the agreed upon changes.
(4) The monthly schedule update submission shall consist of three copies of electronic format on floppy diskettes or compact disks and three copies of the following:
(a) Updated CPM schedule reports (see Item e. above).
(b) Layout output. (See item f. above)
(c) CPM progress narrative.

The CPM progress narrative report submitted as part of the update analysis shall include, but not be limited to, the:

1. Description of schedule status.
2. Discussion of current and anticipated delaying problem areas and their estimated impact.
3. Schedule slippage, pay revisions, and/or progress along the critical path in terms of days ahead or behind the allowable dates, and if the Work is behind schedule, progress along other paths with negative float. This shall be in addition to and not a substitute for requirements in Subsection 108.11.
4. Logic changes and an explanation of the revisions. Revisions to activities not worked on during the period, including changes in duration, or revisions to activity relationships are to be considered logic revisions. Out-of-sequence activities are not acceptable and shall be corrected in logic revisions prior to submission to the Department.

(5) When, in the Engineer's opinion, the CPM schedule fails to reflect the Contractor's actual plan and method of operation, or the Contractor's completion date as indicated by the CPM is more than one month behind the Contract completion date, the Engineer may require the Contractor

to submit for review within ten State Business Days, a recovery plan for completion of the remaining work within the Contract completion date. A recovery plan shall include, but not be limited to, a revised CPM schedule and additional manpower and equipment that shall be utilized to complete the project by the date of Completion.

(6) When the Contractor adds activities that are not Extra Work Items to the CPM schedule, they shall be added in a method that completion dates of any succeeding baseline activities are not affected. All revisions shall be submitted to the Engineer for approval before incorporation into the CPM schedule.

(7) The Engineer shall have the right, within its sole discretion, to prepare its own update(s) or revision(s) to the baseline schedule in the event of a dispute between the parties regarding the appropriateness of the submitted revision(s) or updates to the baseline schedule or by reason of a failure on the part of the contractor to prepare same, which update(s) or revision(s) may reflect what the Engineer has determined to be the actual status of the project progress, actual sequencing of the Work and appropriate scheduling logic required under this Subsection. The Engineer may thereupon rely on its own revision(s) or update(s) of the baseline schedule in the administration of the project, review of claims and/or the imposition of liquidated damages.

**i. Changes and Delays.** To ensure that the CPM schedule continues to accurately reflect the Contractor's plan for the Work and that it incorporates the impact of all changes and delays as soon as the Work scope can be defined, the Contractor shall use the following procedure to incorporate changes and delays.

When Extra Work or a change is proposed or claimed, the Contractor shall submit a Time Impact Evaluation form. Each Time Impact Evaluation must identify in a CPM fragnet sketch, additional work required as a result of the proposal and its interrelationship to the CPM schedule. Each change or delay shall be represented by adding a new activity or activities. These activities shall be clearly identified. This sketch shall show all activities, logic revisions, duration changes, and new activities with all the predecessors and successors. The Time Impact Evaluation form shall also include any associated cost changes for performing the Work in question. Upon the Engineer's approval of the Time Impact Evaluation, the Contractor shall incorporate the fragnet's illustrating the influence of changes and delays into the baseline schedule and the working schedule in the next schedule update. An extension of time may only be considered when the Time Impacted scheduled completion date exceeds the date of Completion. For cases where the Contractor is behind schedule, an extension will be granted for only the amount of time that the Department is responsible as supported by a Time Impact Evaluation. In the event of a dispute, the Engineer may prepare an update, which is believed to be the true impact on the project. No additional compensation will be paid to the Contractor for preparing these revisions. Any request for extension of time shall be verified by CPM analysis and shall be in accordance with Subsection 108.11. Compensation for additional expense to the Contractor and allowance of additional time for completion of the Work shall be as set forth in a Construction Order in accordance with Subsections 108.11 and 109.03.

**2. Staging.** The Contractor shall schedule the Work using such procedures and staging as may be specified in the Contract Documents. Work designated as part of separate stages may be performed simultaneously where provided by the Contract Documents or where approved.

The existing bridge will be operated by the NJDOT until; the traffic is shifted to the newly constructed eastbound half of the bridge. The bridge will than be fully opened and locked in the upright position for demolition by the Contractor.

When the Contract Documents provide for staging or specific procedures, the Contractor may present, for written approval of the Engineer, a detailed, written alternate staging plan or procedure which incorporates the requirements of the Department. If the Contractor proposes an alternate-staging plan, two CPM schedules shall be submitted. One based on the original staging and one based on the Contractor's alternate staging. As a condition of the Engineer's reviewing of the alternate staging plan or procedure, the Contractor agrees that it is not entitled to additional Contract Time or compensation arising from possible delays to construction due to the time spent in reviewing the Contractor's staging plan or procedure, regardless of whether the Department accepts or rejects it. The Engineer will review and approve or reject and or return, with comments, the staging plan within ten State Business Days. If such staging plan or alternate procedure is approved in writing, the Contractor shall then finalize the progress schedule consistent with the alternate approved staging.

3. **Prosecution of the Work.**
   a. At or prior to the preconstruction conference, the Contractor shall furnish the name and location of the solid waste facilities to be utilized as well as the fee structure of each of the facilities. Failure to provide such information shall make the Contractor ineligible for adjusted compensation as provided for in Subsection 104.07.
   b. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the Completion of the Project in accordance with the Contract Documents and within the time set forth under Subsection 108.10.
   c. The Contractor shall supply the Engineer with a weekly work schedule indicating the Contractor's planned work, the subcontractor's planned work, the dates when materials and submissions are to be delivered, and a forecast of lane closings.
   d. The Contractor shall notify the Engineer, in writing, prior to discontinuing work for any reason and at least 24 hours in advance of resuming operations.
   e. The Contractor shall arrange and prosecute the Work so that each successive construction operation at each location shall follow the preceding operation as closely as the requirements of the various types of construction permit.
   f. Underground structures for traffic signals, except for pressure detector installations shall be constructed prior to completion of the intersecting road.
   g. Work, which closes or alters the use of existing roadways shall not be undertaken until adequate provisions, conforming to the requirements of Section 617, have been made by the Contractor and approved.
   h. The Engineer may revise stage construction and maintenance of traffic, if deemed necessary, by the Engineer due to unforeseen circumstances that may arise during construction.
   i. When possible, the construction of subsurface structures adjacent to traffic shall be performed while traffic is being diverted from such areas. If traffic must be maintained in such areas, the Work shall be done expeditiously in stages, as approved, and with minimum interference with traffic.
   j. Subsurface structure excavation adjacent to traffic shall not remain open overnight unless adequately protected by approved safety devices.
   k. The Contractor shall proceed with the Work of demolition of the various buildings that are identified with a demolition number as and when they become available for demolition. If any of the buildings to be demolished is not available for demolition at the time the Contractor begins work on the Project, the Contractor shall temporarily defer its work in the vicinity of the building and complete the Work when the building is made available for demolition.
   l. Operations adjacent to traffic shall be confined to only one side of the traffic at any one time unless otherwise specified in the Contract Documents.
   m. Concrete curbs constructed adjacent to flexible base and surface courses shall be completed, cured, and backfilled before the flexible base and surface courses are constructed.
   n. Bituminous paving operations shall be staged to progress up to the bottom of the surface course. The top layer of the bituminous concrete surface course for the full width of the traveled way, shoulder, and auxiliary lanes shall be paved as a single stage of construction and as the final paving operation.

4. **Acceleration and Default.** If, in the opinion of the Engineer, the Contractor falls behind its baseline schedule, and cannot complete the Work within the time prescribed under Subsection 108.10, as modified pursuant to Subsection 108.11, the Contractor shall take such steps as may be necessary to improve its progress. The Engineer may require the Contractor to increase the number of shifts, begin overtime operations, work extra days including weekends and holidays, or supplement its construction plant and to submit for approval such supplementary schedule or schedules, as may be deemed necessary to demonstrate the manner in which the agreed rate of progress shall be regained, all at no cost to the State.

   Failure of the Contractor to comply with the requirements of the Engineer under this Subheading is grounds for the determination that the Contractor is not prosecuting the Work with such diligence as to ensure Completion within the time specified. Upon such determination, the Engineer may terminate the Contractor's right to proceed with the Work or any separate part thereof in accordance with Subsection 108.17.

5. **Intent, Responsibility, and Time.** Scheduling of construction shall be the responsibility of the Contractor. The Contractor's shall determine the most feasible order of work commensurate with the Contractor's abilities and the Contract Documents. The CPM schedule will be used for determining extensions or reductions of Contract Time pursuant to Subsection 108.11.

It is not intended that the Engineer, by approving the CPM schedule, agrees that it is reasonable in any or all respects or that following the CPM schedule can result in timely completion of the Project. The progress schedule is not a part of the Contract.

If, in the preparation of the CPM schedule, the Contractor reflects a completion date different than that specified under Subsection 108.10, this in no way voids the date set therein. The date as specified in that Subsection governs. Where the CPM schedule reflects a completion date earlier than that specified as the Contract Time, the Engineer may approve such schedule with the Contractor specifically understanding that no claim for additional Contract Time or compensation shall be brought against the State as the result of failure to complete the Work by the earlier date shown on the CPM schedule.

**6. Payment.** Payment for the accepted progress schedule will be made on a lump sum basis for the costs for schedule preparation, maintenance, updating, facilities, personnel, computer hardware and software requirements, schedule submittals and reproduction as specified. Twenty-five percent of the lump sum bid will be paid upon approval of the baseline submission, and the balance paid on approval of updates at a prorated sum based upon the number of anticipated updates to be submitted during the Contract Time.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| PROGRESS SCHEDULE | LUMP SUM |

**108.05 Mobilization.**

THE ENTIRE SUBSECTION IS CHANGED TO:

Mobilization shall consist of the preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the Project site, and other work performed or costs incurred prior to beginning Work.

Payment for mobilization will be made on a lump sum basis regardless of the fact that the Contractor may have, for any reason, shut down its work on the Project or moved equipment away from the Project and back again.

Payment will be made in accordance with the following schedule:

1. When five percent of the Work is completed and the Baseline Progress Schedule is approved by the Engineer, 25 percent of the lump sum bid for mobilization or 2.5 percent of the Total Contract Price, whichever is less, will be paid.
2. When ten percent of the Work is completed and all required CPM Progress Schedule Updates are approved by the Engineer, 50 percent of the lump sum bid for mobilization or five percent of the Total Contract Price, whichever is less, will be paid.
3. When 15 percent of the Work is completed and all required CPM Progress Schedule Updates are approved by the Engineer, 75 percent of the lump sum bid for mobilization or 7.5 percent of the Total Contract Price, whichever is less, will be paid.
4. When 20 percent of the Work is completed and all required CPM Progress Schedule Updates are approved by the Engineer, 100 percent of the lump sum bid for mobilization or ten percent of the Total Contract Price, whichever is less, will be paid.
5. When all Work on the Project is complete, payment for the lump sum bid for mobilization in excess of ten percent of the Total Contract Price will be made.
6. The percentage of Work completed shall be the total of payments earned compared to the Total Contract Price. The total of payments earned excludes the amount paid for this item and the amount paid for materials furnished but not incorporated into the Work in accordance with Subsection 109.06, as shown on the monthly estimates of the approximate quantities of Work performed, prepared in accordance with Subsection 109.05.
7. No payment will be made for mobilization until a Baseline Schedule is approved, except when all Work on the Project is complete, then 50 percent of the lump sum bid for mobilization will be paid and no further payment(s) will be made for the lump sum bid for mobilization.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| MOBILIZATION | LUMP SUM |

When mobilization is not a Pay Item, all costs for the Work shall be included in the prices bid for various Pay Items scheduled in the Proposal.

**108.06 Limitations of Operations.**

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

To protect the winter flounder run during migration and spawning, a timing restriction of January 1 to June 30, prohibiting in-water construction activities is imposed to reduce the possibility of increases in turbidity. To protect the anadromons fish run during migration and spawning a timing restriction of April 1 to April 30, prohibiting in-water construction activities is imposed to reduce the possibility of increased turbidity. If cofferdams are constructed prior to the timing restriction, construction within the cofferdams may proceed during the timing restriction. The cofferdam structures shall be removed only during the authorized time for work within the waterway.

**108.10 Time of Completion.**

A. All work necessary to open River Road and Riviera Drive to traffic that requires traffic to be detoured in Stages 1B - Phase 3 and Stage 2 – Phase 1 shall be completed in 5 calendar days from the start of the first detour.

B. All work required for Substantial Completion of the Project shall be completed on or before October 19, 2010.

C. The entire Work of the Project shall be completed on or before December 17, 2010.

**108.11 Extensions and Reductions of Contract Time.**

THE ENTIRE TEXT IS CHANGED TO:

**A. Basis for Adjustment.** Extensions or reductions to the Contract Time may be provided by Construction Order, however, such extensions or reductions will be allowed only to the extent that the increase or decrease in the Work or delays of the types indicated below affect the Critical Path of the current approved Progress Schedule update and the Completion of the Work and/or Substantial Completion Dates provided in Subsection 108.10. However, when the Finish Milestone(s) for the Substantial Completion Date or Completion of the Work Date identified on the current approved schedule is a date or dates prior in time to the dates specified in the Contract, the Department will consider the time between the dates projected in the schedule and that in the Contract as constituting float in the schedule which shall offset the amount of allowable delay contributable to the actions of the Department, third parties, or the Contractor, or caused by a combination of those factors, and other factors beyond the control of the Contractor as determined by the Department which ever first occurs.

An extension will also provide only for those Working Days adversely impacted where operations were on an approved schedule, including all shifts of Work. No extension can be requested unless all submittals and approvals have been completed as specified in Subsection 108.04.

The Contractor may be granted an extension of Contract Time and not be assessed liquidated damages for any portion of the delay beyond the Completion of the Work and/or Substantial Completion Dates as specified in Subsection 108.10 caused by reasons beyond the control and without the fault or negligence of the Contractor, and subject to all due diligence by the Contractor to avoid and mitigate the delay. Reasons may include, but are not restricted to, those provided for in the Specifications and the following:

1. acts of civil or military authorities, terrorism, war, or riot;
2. fire;
3. floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes, sustained severe winds exceeding 75 mph, or other cataclysmic natural phenomenon (except on working day contracts);
4. Extreme Weather Conditions (subject to Item 1 of subpart B) (except on working day contracts);
5. epidemics or quarantine restrictions;
6. strikes or labor disputes beyond the control of the Contractor that prevent work on the construction operations that are critical to the completion of the Project;
7. shortages of materials (subject to Item 2 of subpart B) or freight embargoes;
8. acts of the State in its sovereign capacity;
9. court orders or injunctions;
10. discovery of Regulated Hazardous Waste;
11. acts by others consistent with Subsections 105.10 and 107.09;

12. failure of the Engineer to furnish interpretations of the Contract Documents (subject to Item 3 of subpart B).

Unless specifically provided for in the Specifications or where the delay is caused by the negligence, bad faith, active interference, or other tortuous conduct of the Department or its employees, the Contractor shall not make any claim for damages or Additional Compensation for any delay, and agrees that any such delay shall be fully compensated for by an extension of Contract Time if granted. In such a case where the delay is shown by the Contractor to have been caused by such tortuous conduct of the Department or its employees, the Contractor's remedy for Additional Compensation shall be as specified in Subsection 109.04. Negligence of consultants, other contractors, Utility(s), other public entities or any other person or entity, shall not be imputed to the Department. The Contractor shall not be entitled to Additional Compensation or an extension of Contract Time for any delay contemplated or that which should have been contemplated by the Contractor at the time the Contract was awarded.

Extensions of Contract Time will not be granted due to delays caused by, or in any way related to, the financial condition of the Contractor, subcontractors, sub-subcontractors, material, personnel, fabricators, or suppliers. The Contractor and its surety assume full responsibility for ensuring that the financial condition of any of the above does not delay completion of the Contract.

If the Work required is reduced or altered so that the time required for Completion is reduced, the Department may reduce the Contract Time as specified in Subsection 108.10. The Engineer will evaluate the facts and the extent of the reduction. The Department's findings thereon will be final and conclusive.

The Contractor or surety is not relieved of liability for liquidated damages for any period of delay in completion in excess of that expressly provided for in this Subsection.

**B. Requests for Extensions.** Request for extension of Contract Time will not be evaluated or granted unless they meet the provisions of A. above and the Contractor has notified the Resident Engineer in writing of the causes of delay within 15 State Business Days from the beginning of any such delay on forms provided by the Department. The effect of the delay on the Progress Schedule shall be documented by the Contractor as specified in Subsection 108.04. The Department will evaluate the facts and the extent of the delay, and the Department's findings will be final and conclusive. Request for extensions shall also be based on the following:

1. If the Contractor submits daily documentation of such conditions, Extensions of Contract Time for Extreme Weather Conditions may be granted according to the following:
   a. The specified completion dates anticipate that the number of total Working Days available for Construction Operations, subject to the requirements of the Contract Documents, during the period of April through November inclusive is at least 145 for road and bridge work.
   b. The specified completion dates anticipate that the number of total Working Days available for Construction Operations, subject to the requirements of the Contract Documents, during the four month winter period of December through March inclusive is twenty (20) for road work and forty (40) for bridge work.
   c. When the actual number of Working Days available for Construction Operations is less than the anticipated number provided for in the Special Provisions, an extension of one day for each day less may be allowed.
2. Extensions of Contract Time will not be granted for a delay caused by a shortage of materials unless the Contractor furnishes the following:
   a. Documentary proof that it has diligently made every effort to obtain such materials from all known sources within reasonable distance from the Work.
   b. Proof that the inability to obtain such materials when originally planned, could not be compensated for by revising the sequence of the Contractor's operations. The term "shortage of materials" applies only to raw and fabricated materials, articles, parts, or equipment which are standard items and does not apply to materials, parts, articles, or equipment which are processed, made, constructed, fabricated, or manufactured to meet the specific requirements of the Contract. Only the physical shortage of materials and not the cost of materials will be considered.
3. Extensions of Contract Time will not be granted for failure of the Engineer to furnish interpretations of the Contract Documents unless such request for an interpretation of the Contract Documents is reasonable and made in good faith, and the failure to respond was

palpably unwarranted and was furnished more than 20 State Business Days after the written request was received by the Resident Engineer.

4. Extension of Contract Time for utility work delays will only be granted when the Utility does not complete their work within an additional 30% of the estimated durations for the Utility as specified in Subsection 105.09. A day for day extension will be allowed for each day extended beyond the 30% time that the Critical Path is affected.

**108.12 Right-Of-Way Delays.**
THE TITLE OF THIS SUBSECTION IS CHANGED TO:

**108.12 Right-Of-Way Information and Delays.**

**108.12 Right-Of-Way Information and Delays.**
THE FOLLOWING IS ADDED:

The Contractor shall obtain from the Engineer all information regarding ROW Parcels and Easements acquired for the Project as well as the nature and type of title acquired. The Contractor shall make periodic requests for updates to this information during the course of the Contract.

The Contractor shall not enter an Easement until the Resident Engineer provides written notice to the property owner. The Contractor shall provide written notice to the Resident Engineer, 30 calendar days prior to entering a particular Easement or right, which is lesser than a fee interest. The Contractor shall make no claim for delays by reason that entry upon an Easement or right which is lesser than a fee interest is conditioned upon notice or is limited in duration; the Contractor is required to schedule accordingly and take such limitations into account when planning performance of the Work.

Temporary Easements and/or temporary construction rights will in most cases contain a limitation as to the length of time that they are extant. The Contractor shall schedule the Work pursuant to Subsection 108.04 so as to accommodate the particular time limitations of an Easement or right which is lesser than a fee interest as reflected on the R.O.W. plans. The Contractor shall provide a written request to the Engineer that the Department procure an extension from the owner of a particular temporary easement or right, which is lesser than a fee simple interest, so as to enable the Contractor to continue occupancy of or re-enter same in the future, beyond the initial time period set forth in the respective property description prior to the expiration thereof.

Where the Contractor fails to complete the work within an area of a temporary easement or right lesser than a fee interest during the time allowed under the property description, by reason of the Contractor's own fault; the Contractor shall reimburse the State for the sum payable to the owner of the underlying fee interest for the extended period of occupancy use. The Resident Engineer may deduct an amount equal to such payments from the monthly estimate of the Work performed after providing 30 day written notice to the Contractor of such action, including a breakdown of the costs sought or to be sought by reason of the delay in timely vacating a temporary easement or right lesser than a fee interest.

The following is a list of all rights-of-way that have not been secured and their approximate anticipated dates of availability:

**Properties and Vacation/Availability Dates**

| Demolition and/ or Parcel No. | Approximate Baseline Station | Offset/Direction | Date |
|---|---|---|---|
| **R36** | **87+00** | **RT** | **January 1, 2006** |

**108.16 Failure to Complete on Time.**
THE SUBSECTION HEADING AND TEXT ARE CHANGED TO:

**108.16 Liquidated Damages and Incentive Payments For Early Completion.**

**A. Liquidated Damages.** The Contractor and the Department recognize that delay in Completion results in damages to the State in terms of the effect of the delay on the use of the Project, upon the public convenience and economic development of the State, and also results in additional costs to the State for engineering, inspection, and administration of the Contract. Because it is difficult or impossible to accurately estimate the damages incurred; therefore, the parties agree that if the Contractor fails to complete the Contract within the time stated in these Special Provisions, or within such further time as may have been granted in according to the provisions of the Contract, the Contractor shall pay the State liquidated damages according to those provided in the Special Provisions. Such liquidated damages shall

be paid for each and every day, as hereinafter defined, that the Contractor is in default to complete the Contract.

Liquidated damages shall be as follows:

1. For each Calendar day that the Contractor fails to complete Construction Operations, as specified in Subpart A of Subsection 108.10 of these Special Provisions, the Contractor shall pay liquidated damages to the State in the amount of $4,000.00.
2. For each Calendar Day that the Contractor fails to complete the Work, as specified in Subpart B of Subsection 108.10 of these Special Provisions, for Substantial Completion, the Contractor shall pay liquidated damages consisting of Road User Costs and Construction Engineering Costs to the State in the amount of $5,600.00.
3. For each Calendar Day that the Contractor fails to complete the entire Work of the Project as specified in Subpart C of Subsection 108.10 of these Special Provisions, for Completion of the Work, the Contractor shall pay liquidated damages consisting of Construction Engineering Costs to the State in the amount of $1,850.00, provided that the Work as specified for Substantial Completion is actually completed.

The Department will recover all liquidated damages specified above by deducting the amount thereof from any monies due or that may become due the Contractor, or from the Contractor or from its surety on this or any other contract being performed for the Department.

**B. Incentive Payment for Early Completion.**

No Incentive Payment for Early Completion is specified for this project

**108.19 Lane Occupancy Charges.**

THE SECOND PARAGRAPH IS CHANGED TO:

Except as specifically excluded in the Special Provisions, a Lane Occupancy Charge will be collected by deducting the appropriate charge, calculated according to this Subsection, from the monthly estimate, whenever a lane or lanes are not promptly made available to the traveling public during the lane closure limits for the following reasons: equipment breakdowns; non-extreme weather related causes; late start of work; shortage of labor, materials, fuel, machinery or equipment or by reason of the Contractor's negligence or fault or that of its workers, employees, subcontractors or suppliers. This charge will be collected for that period of time each lane is unavailable to the traveling public beyond the lane closure limits. This charge will be calculated by multiplying the length of time of the delayed opening, in minutes, by the rate of $10 per minute per lane, unless otherwise set forth in the Special Provisions.

THE THIRD PARAGRAPH IS CHANGED TO:

The total amount of the Lane Occupancy Charge collected from a Contractor shall not exceed $10,000.00 per day.

THE FOURTH PARAGRAPH IS CHANGED TO:

The Resident Engineer will keep record of each occurrence as well as the cumulative amount of time that a lane is kept closed beyond the lane closure limits. After each occurrence the Contractor will be notified. For every three such occurrences, one day will be deducted from the Substantial Completion date or days. For every 60 minutes of lane closures recorded beyond the lane closure limits, one additional day will be deducted from the Substantial Completion date or days. The Substantial Completion date or days will be re-established. The Contractor will be notified of such action, and the Contractor shall not make any claim against the Department as a result of such action. The Resident Engineer also reserves the right to suspend all Work until the next allowable lane closure time period, where the Contractor exceeds the lane closure limits. Before deduction of any charge from a monthly estimate for occupancy of a lane beyond the allowable lane closure hours, the Department will provide the Contractor with a statement of the charges to be collected and the supporting calculations.

THE FOLLOWING IS ADDED:

The rate or rates to be applied in the calculation of a Lane Occupancy Charge shall be in accordance with the following:

| Description | Rate per Minute per Lane |
|---|---|
| Overrun of "One Lane of Traffic" Time Limits | $10/minute |
| Overrun of "Alternating One-Way Traffic" Time Limits | $10/minute |

THE FOLLOWING NEW SUBSECTION IS ADDED:

**108.20 ITS Occupancy Charges**

The Contractor shall be restricted to when the existing ITS fiber optic facilities will be allowed to be out of operation in order for the Contractor to complete work under the Contract that impacts the Department ITS facilities. An ITS Occupancy Charge shall be assessed at a minimum of $1000 per hour, or increased based on the costs calculated by the Department, for each hour the Contractor fails to restore ITS operations. The charge will be recorded and collected as specified in Subsection 108.19. The Department may determine not to collect charges when the failure to restore ITS operations meets the conditions specified for extraordinary, exigent circumstances as specified in Subsection 108.19.

## SECTION 109 – MEASUREMENT AND PAYMENT

**109.01 Measurement of Quantities.**

THE 25TH TYPE 2 PAY ITEM IS CHANGED TO:

| *Type 2 Pay Items* | *Charge per Unit of Measure* |
|---|---|
| SAWCUT GROOVED DECK SURFACE | $0.06 PER SQUARE FOOT |

THE FOLLOWING ITEMS ARE ADDED TO THE TABLE OF TYPE 2 PAY ITEMS:

| *Type 2 Pay Items* | *Charge per Unit of Measure* |
|---|---|
| FOUNDATION EXCAVATION, REGULATED WASTE | $0.32 per cubic yard |
| FOUNDATION EXCAVATION, RIVERBED | $0.32 per cubic yard |
| CONCRETE IN STRUCTURES, FOOTINGS, CLASS A, HPC | $1.60 per cubic yard |
| CONCRETE IN SUPERSTRUCTURE, DECK SLABS, HPC | $3.20 per cubic yard |
| CONCRETE IN SUPERSTRUCTURE, SIDEWALKS, HPC | $1.60 per cubic yard |
| CONCRETE IN SUPERSTRUCTURES, PARAPETS, __HIGH, HPC | $0.32 per linear foot |
| CONCRETE IN SUPERSTRUCTURES, BRIDGE MONUMENT, HPC | $2.10 per cubic yard |
| CONCRETE IN SUBSTRUCTURES, PIER COLUMNS AND CAPS,HPC | $2.10 per cubic yard |
| CONCRETE IN SUBSTRUCTURES, PRECAST 8000 PSI, HPC | $2.10 per cubic yard |
| PRETENSIONING STRAND IN CAP BEAM, EPOXY COATED | $0.01 per pound |
| POST TENSIONING STRAND IN SUBSTRUCTURE, EPOXY COATED | $0.01 per pound |
| POST TENSIONING BAR IN SUBSTRUCTURE | $0.01 per pound |

**109.02 Scope of Payment.**
THE SECOND PARAGRAPH IS CHANGED TO:

The "Basis of Payment" clause in the Specifications relating to any Pay Item in the proposal encompasses all compensation for Work to complete that Pay Item and no other Pay Item. All elements of the Work related to that Pay Item will not be measured or paid for under any other Pay Item in the Contract Documents unless it is stated in the "Basis of Payment" clause for that Pay Item that a portion of the Work will be paid for under another Section or Subsection of the Specifications.

**109.03 Force Account Payment.**
THE FIRST, SECOND, THIRD, AND FOURTH PARAGRAPH ARE CHANGED TO:

When the Department has directed the Contractor to do Work on a Force Account basis it will be compensated as specified in this Subsection.

The total direct costs for labor, materials, equipment, bonds, insurance, and tax as provided below, together with applicable markups constitute full compensation for all direct and indirect costs (including overhead and profit), and are deemed to include all items of expense not specifically designated. Any adjustments to Performance Bond and Payment Bond will be made as specified in Subsection 103.05. Force Account payments will be adjusted for those costs incurred determined to be the fault of the Contractor. The Force Account payment will be further adjusted where the Contractor's prices in its Proposal for any affected original items of work did not properly include all the costs to complete the affected work as originally provided in the Contract Documents.

When Work that is paid on a Force Account basis is performed by forces other than the Contractor's organization, the Contractor shall reach an agreement with such other forces as to the distribution of payments made by the State for such Work, with a copy of all such completely executed agreements to the Resident Engineer. Additional payment will not be made for any reason due to the performance of the Work by a subcontractor or other forces, or for costs outside that covered by the agreement.

It is understood that a Contractor's remedy for Additional Compensation for Extra Work or for any other reason as specified in these Specifications, when an action is brought before the Superior Court as specified in the Contractual Liability Act, NJSA 59:12-1 et seq., shall not exceed the amount that would be specified in these provisions had a Force Account been carried out. However, damages sought by the Contractor in a court proceeding shall be limited to actual additional costs incurred by the Contractor resulting directly from the Extra Work or by other reason specifically permitted under the terms of the Specifications as specified in the Contractual Liability Act. As a condition predicate to seeking Additional Compensation under the claims process or in the Superior Court, the Contractor shall have the burden of proof to demonstrate compliance with the requirements of this Subsection and other applicable Subsections, and shall have kept all records required under this Subsection even if the Department has not directed that the Contractor do such Work on a Force Account basis.

Force Account payment will be limited to the following:

**1. Labor.**
THE FIRST PARAGRAPH IS CHANGED TO:

For all necessary direct labor and foremen in direct charge of the specific operations, whether the employer is the Contractor, subcontractor, or another, the Contractor shall receive the rate of wage (or scale) actually paid as shown in its certified payrolls for each and every hour that said labor and foremen are actually engaged in such Work.

For specific extraordinary operations the Department may allow supervising or other special type employees to be considered direct labor, but only that time in direct labor or direct charge to complete the specific construction operations.

**2. Bond, Insurance, and Tax.**
THE ENTIRE TEXT IS CHANGED TO:

For bond premiums; property damage, liability, and workers compensation insurance premiums; unemployment insurance contributions; and social security taxes on the Force Account work, the Contractor shall receive the actual incremental cost thereof, necessarily and directly resulting from the Force Account work. For payment, the Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance, and tax.

Payment for Performance Bond and Payment Bond adjustments will be as specified in Subsection 103.05.

**4. Equipment and Plant.**

**a. Contractor Owned Equipment and Plant.**
THE SECOND AND THIRD PARAGRAPH ARE CHANGED TO:

The Blue Book will be used in the following manner:

(1) The estimated "rental" hourly rate will be determined by dividing the monthly rate by 176 and then applying a 20% reduction factor. The weekly, hourly, and daily rates will not be used.
(2) The estimated operating costs per hour will be the Blue Book rates.
(3) The number of hours to be paid for will be the number of hours that the equipment or plant is actually used on a specific Force Account activity each day, as presented in Daily Equipment Work Sheets, received from the Contractor and verified by the Department.
(4) The current revisions will be used in establishing rates. The current revision applicable to specific Force Account work is as of the first day of work performed on that Force Account work and that rate applies throughout the next six months of the period the Force Account work is being performed. The rates will be adjusted for each six-month period thereafter.
(5) Area adjustment will not be made. Equipment life adjustment will be made in according to the rate adjustment tables.
(6) Overtime shall be charged at the same rate indicated in Item (1) and (2) above.
(7) Idle time for equipment will not be paid for, except where the equipment has been held on the Project site on a standby basis at the request of the Engineer and, but for this request, would have left the Project site. Such payment will be made at one-half the rate established in Item (1) above and will be limited to the total hours worked for any Force Account activity on that particular day.
(8) The rates established above include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage, overhead, profits, insurance, all costs (including labor and equipment) of moving equipment or plant to, on, and away from the site, and all incidentals.
(9) Operator costs will be paid only as provided in Subheading 1 above.

All equipment shall, in the opinion of the Department, be in good operating condition. The State will not provide payment of any type for equipment that is determined to be unsuitable by the Department for the Force Account Work or that is inoperable during periods of breakdown or repair. Equipment used by the Contractor shall be specifically described and be of suitable size and suitable capacity required for the work to be performed. In the event the Contractor elects to use equipment of a higher rental value than that suitable for the Work, payment will be made at the rate applicable to the suitable equipment. The equipment actually used and the suitable equipment paid for will be made a part of the record for Force Account work. If there is a differential in the rate of pay of the operator of oversize or higher rate equipment, the rate paid for the operator will be that for the suitable equipment.

**b. Rented Equipment and Plant.**
THE ENTIRE TEXT IS CHANGED TO:

In the event that the Contractor does not own a specific type of equipment or plant and must obtain it by rental, the Contractor shall inform the Resident Engineer of the need to rent the equipment and of the rental rate for that equipment prior to using it on the Work. The Contractor will be paid the actual rental for the equipment as specified in the rental agreements for the time that the equipment is actually used to accomplish the Work, provided that rate is reasonable, plus the cost of moving the equipment to, on, and away from the Project site. The Contractor shall provide the Resident Engineer a copy of the fully executed rental agreement, and a paid receipt or canceled check for the rental expense incurred.

If the rental agreement does not cover operating costs, the Contractor shall be entitled to the rate established in Subheading 4.a. above for each hour that piece of rental equipment is actually operational.

The State will not provide payment of any cost incurred due to equipment that is determined to be unsuitable by the Department for the Force Account Work or that is inoperable during periods of breakdown or repair.

**5. Profit.**
THE ENTIRE TEXT IS CHANGED TO:

Profit shall be computed at ten percent of the following:
a. Total material cost excluding transportation, shipping & handling.
b. Total direct labor cost (actual hours worked multiplied by the regular hourly rate).

c. Total fringe benefits on total direct labor cost as computed above.

**6. Overhead.**
THE ENTIRE TEXT IS CHANGED TO:

Any and all overhead for the Contractor is defined to include the following:

a. All salaries and expenses of executive officers, supervising officers, or supervising employees, except as provided for under Subheading 1 above;
b. All clerical or stenographic employees;
c. All charges for minor equipment, such as small tools, including shovels, picks, axes, saws, bars, sledges, lanterns, jacks, cables, pails, wrenches, and other miscellaneous supplies and services; and
d. All drafting room accessories such as paper, tracing cloth, and blueprinting.

Any and all overhead costs of the Contractor for Force Account work shall be computed at 15 percent of the following:

a. Total material cost excluding transportation, shipping & handling.
b. Total direct labor cost (actual hours worked multiplied by the regular hourly rate), except for the direct labor cost of any supervisory or special employees allowed under Subheading 1. above.
c. Specific extraordinary overhead expenses, required specifically for the Force Account, may be allowed if approved by the Department prior to incurring any cost. In such instances, the Contractor will be paid only the reasonable costs of such extraordinary overhead expenses.
d. Total fringe benefits on total direct labor cost as computed above.

The Contractor will be allowed an additional five percent for overhead on the total amount of all work performed by the subcontractors.

THE FOLLOWING IS ADDED:

**8. Responsibility.**

Where work is performed under a Force Account, responsibility of such work shall remain that of the Contractor. The Department will determine if the Work is eligible for payment.

**109.04 Payment for Contractor's Expenses During Delays.**
THE FIRST PARAGRAPH IS CHANGED TO:

When the Department has approved an adjustment for Additional Compensation due to a delay, the Contractor will be paid its expenses during that period of delay by Change Order in the following manner:

**2. Bond, Insurance, and Tax.**
THE ENTIRE TEXT IS CHANGED TO:

For bond premiums; property damage, liability, and, workers compensation insurance premiums; unemployment insurance contributions; and social security taxes during the period of delay, the Contractor is to receive the actual incremental cost thereof, necessarily and directly resulting from the delay. For payment, the Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance, and tax.

Payment for Performance Bond and Payment Bond adjustments will be as provided in Subsection 103.05.

**3. Equipment.**
THE FIRST PARAGRAPH IS CHANGED TO:

For any idle machinery or special equipment other than small tools which must remain on the Project site, with approval of the Department, during delays of specific operations, the Contractor is to receive compensation at one-half the rate calculated pursuant to Subheading 4 of the fifth paragraph of Subsection 109.03. Should the Department determine that it is not necessary for machinery or equipment to remain on the Project during delays, the Contractor is to receive transportation costs to remove the machinery or equipment and return it to the Project at the end of the delay period.

**4. Miscellaneous.**
THE SUBPART HEADING IS CHANGED TO:

**4. Overhead.**

**6. Records.**
THE SECOND AND THIRD PARAGRAPH ARE CHANGED TO:

The Department's records will be compared with completed daily reports furnished by the Contractor and any necessary adjustments will be made. When these daily reports are agreed upon and signed by both parties, said reports become the basis of payment for the expenses incurred, but do not preclude subsequent adjustment based on a later audit by the Department.

The Contractor's cost records pertaining to expenses under this Subsection shall be open to inspection or audit by the Department during the life of the Contract and for a period of not less than three years after Acceptance thereof, and the Contractor shall retain such records for that period. Where payment for equipment or labor is based on the cost thereof to forces other than the Contractor, the Contractor shall make every reasonable effort to ensure that the cost records of such other forces are open to inspection and audit by the Department on the same terms and conditions as the cost records of the Contractor. Payment for such cost may be deleted if the records of such third parties are not made available to the Department. If an audit is to be commenced more than 60 days after Acceptance, the Contractor is to be provided with a reasonable notice of the time when such audit is to begin. In case all or a part of such records are not made so available, the Contractor understands and agrees that any items not supported by reason of such unavailability of the records will not be allowed, or if payment therefore has already been made, the Contractor shall refund to the Department the amount so disallowed.

**109.06 Materials Payments.**
THE SUBSECTION HEADING IS CHANGED TO:
**109.06 Materials Payments and Storage.**

THE FIRST PARAGRAPH IS CHANGED TO:

The monthly estimates and payments made on account thereof may also include, when authorized by the Department, an amount equal to the actual cost of materials furnished but not incorporated into the Work, provided, however, that such amount does not exceed 85 percent of the Contract price for the Pay Item into which the material is to be incorporated, and the quantity allowed does not exceed the corresponding quantity estimated in the Contract Documents. Advance payment will only be for that portion of the price in the Proposal related to the materials and any costs for storage at the facility of manufacture. Any taxes levied by any government against the materials shall be borne by the Contractor. Before including payments for such materials in an estimate, the Department must be satisfied that:

1. The materials have been properly stored and protected along or upon the Project site or have been stored and protected at locations owned or leased by the Contractor or the Department within the State, except that structural steel, prestressed concrete beams, and other large items not suitable for storage on or near the site, may be stored outside the State with the approval of the Department; and
2. The materials have been inspected and appear to be acceptable based upon available supplier's certification and/or materials test reports; and
3. The Contractor has provided the Resident Engineer with an paid invoice or paid bill of sale for the materials and a fully executed Department form "Release of Liens for Materials Stored for Incorporation in Department of Transportation Project" including the transfer of ownership to the Department; and
4. The materials are clearly identified in large letters as being without encumbrances and for use solely on the Project, and if stored on property not belonging to the State or at the facility of manufacture, are fenced in with access limited to the State and the Contractor; and
5. When such materials are stored in a leased area, the lease is made out to the Contractor and provides that it shall be canceled only with the written permission of the Department.

THE FOURTH PARAGRAPH IS DELETED:

**109.07 Payment Following Substantial Completion.**
SUBPART 1 OF THE FIRST PARAGRAPH IS CHANGED TO:

1. Each subcontractor or supplier has been promptly paid any amount due from any previous progress payment and shall be paid any amount due from the current progress payment, including all retainage

withheld from the subcontractor or supplier, within 14 days of the receipt by the Contractor of payment from the Department; or

THE LAST PARAGRAPH IS CHANGED TO:

All monies retained subsequent to the first estimate following Substantial Completion may be released as specified in Subsection 109.11.

**109.09 Payment Following Acceptance.**

THE ENTIRE SUBSECTION IS CHANGED TO:

All Partial payments by monthly estimate will be processed prior to acceptance. Final payment will be made as specified in Subsection 109.11.

**109.10 As-Built Quantities.**

THE FIRST AND SECOND SENTENCE OF THE SECOND PARAGRAPH ARE CHANGED TO:

The Resident Engineer may from time to time, before Substantial Completion, prepare as-built quantities and incorporate these quantities into monthly estimate certificates through an appropriate Field Order or Change Order. Such interim as-built quantities are subject to recalculation in completion of the Final Certificate.

THE THIRD PARAGRAPH IS DELETED.

**109.11 Final Payment and Claims.**

THE ENTIRE SUBSECTION IS CHANGED TO:

1. **Final Certificate.** All prior estimates and payments made by the Department are subject to correction in the Final Certificate, which will be completed as follows:
    a. After Acceptance is completed as specified in Subsection 105.23 and the As-Built quantities finalized, the Department will make an estimate of the total amount of Work done under the Contract, and prepare and issue the Final Certificate to the Contractor.
    b. Within 30 State Business Days after said Final Certificate has been issued to the Contractor, the Contractor shall submit to the Department either a written acceptance of the Final Certificate without exception together with an executed release in the form provided with the Final Certificate or a written acceptance of the Final Certificate with a reservation of specific claims, but otherwise releasing all claims not specifically reserved, by executing a conditional release in the form provided with the Final Certificate. The Contractor's failure to submit any written acceptance or acceptance with reservation within said 30 days will be construed by the Department as an acceptance by the Contractor of the Final Certificate without exception or reservation of Claims.
    c. Upon receipt of the Contractor's written acceptance of the Final Certificate with unconditional or conditional release, or when the Contractor fails to provide any written acceptance of the Final Certificate within 30 State Business Days of issuance, the Department will pay the entire sum due thereunder as provided by the New Jersey Prompt Payment Act NJSA 52:32-32 *et seq.*, provided the Final Certificate indicates a payment is due the Contractor. However, where the Final Certificate indicates a Credit (payment) is due the Department, the Contractor shall remit said Credit (payment) to the Department in the amount set forth in the Final Certificate.
    d. If the Contractor fails to remit the Credit (payment) due the Department, as indicated on the Final Certificate, within 30 State Business Days of issuance of the Final Certificate, the Department may pursue all legal means available to recover the amount due the State, including but not limited to, deducting the amount from payment due the Contractor on this or other Department Contracts or from retainage and/or the sale of bonds held in lieu of retainage for the Contract or for other Contracts, even where the credit is being contested by the Contractor.

Neither the failure of the Contractor to accept the tendered Final Payment nor the failure of the Contractor to remit the credit (payment) due the Department shall affect when the "Completion of the Contract" shall be deemed to have occurred for any reason. Where there is a remaining monetary balance due to the Contractor by the Department, Final Payment will be made after the "Completion of the Contract". Retainage shall be released to the Contractor upon completion of the contract unless a credit

(payment) is due to the Department, which shall be deducted or adjusted in accord with the Specifications.

**2. Conditions for Claims.** Conditional acceptance of the Final Certificate will be permitted only where all of the following are met:

a. When the Contractor submits a Release conditioned with exception or reservation, the release shall state the specific monetary amounts and category of the claims being reserved. The Contractor acknowledges, by the act of executing the contract, that the failure to state specific monetary amounts and specific categories shall result in a waiver of such claims lacking as to amounts or specific categories thereof. The Contractor may reserve only those claims properly filed with the Department pursuant to Subsection 107.02 and not previously resolved. The Contractor waives all claims for which the required notice has not been filed with the Department.

b. The Contractor further understands and agrees, by the act of executing the Contract that neither the procedures established under this Subsection nor the review of claims by the Department pursuant hereto shall in any way modify the requirements applicable to the filing of a Contractual Notice Form or the filing of a suit pursuant to the provisions of N.J.S.A. 59:13-1 *et seq*. .

c. If the Contractor conditions its acceptance of the Final Certificate by reserving particular claims, the Contractor shall at the same time state in writing whether it would like to submit its reserved claims for review by the Department Claims Committee. Only those claims properly reserved, as provided for in Subsection 107.02, and which are unresolved after completing Steps I and II of the Contractual Claim Resolution Process for the resolution of contract claims, are eligible for review by the Department Claims Committee to the extent provided in that Subsection. If the Contractor states that it does not want Department Claims Committee review of the reserved claims or if it fails to request Department Claims Committee review of reserved claims when it conditions its acceptance of the Final Certificate or if it files suit in a court of law regarding those claims, the Contractor shall be deemed to have waived any ability to have its reserved claims reviewed by the Department Claims Committee.

d. If the Contractor requests review of its reserved claims when it conditions its acceptance of the Final Certificate, it shall send at the same time a copy of its request for review to the Secretary of the Department Claims Committee, PO Box 600, Trenton, NJ 08625-0600. Department Claims Committee review will then take place according to Subsection 107.02.

e. At the election of the Contractor upon completion of the Contract, claims that are unresolved after review by the Department Claims Committee may be submitted to Non-Binding Mediation according to Subsection 107.02.

f. Interest shall neither be paid nor shall it accrue upon the amount of any additional compensation paid in resolution or settlement of a claim resolved through the various steps of the Contractual Claims Resolution Process.

# DIVISION 200 - EARTHWORK

## SECTION 201 - CLEARING SITE

**201.04 Removal of Bridges, Culverts, and Other Structures.**
THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAPH:

Portions of the excavation must be treated as regulated waste and salt laden soils.

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Unless otherwise shown on the plans, the substructures of existing structures shall be removed down to at least 3 feet below the natural stream bottom, and those parts outside of the stream shall be removed down to at least 2 feet below natural ground surface.

THE FOLLOWING IS ADDED TO THE THIRD PARAGRAPH:

The following items shall be salvaged from the Route 70 Manasquan River Drawbridge and delivered to Wall Township Drawbridge Operations, 2436 Paynters Road Manasquan, NJ:

1. Desk (1)
2. Refrigerator (1)
3. Employee Lockers (4)
4. Ten ob. Fire Extinguishers (4)
5. Three (3) Draw File Cabinets
6. 5hp Ariens Snow Blower
7. Yellow Diesel Fuel Can
8. Red Gasoline Cans (2)
9. Black Upholstered Standard Chairs (2)

Mr. Ken Kreugebauer (732-528-9494) shall be notified a minimum of one (1) week prior to delivery of any item.

The following additional items shall also be salvaged from the Route 70 Manasquan River Drawbridge and delivered to Wall Township Electrical Operations, 2436 Paynters Road, Manasquan, NJ:

1. Control Desk – Located in the Bridge operator's house, including all related electronic equipment.
2. Electronic control processor & cabinets, to include Sy-Max controller cards. These items are located on the lower area of the bridge operator's house and across the waterway channel, on the far side bridge structure.
3. All Westinghouse control-drive cabinets and related hardware.
4. Roadway Crash Gates. (Does not include the crash gate housings)
5. Barrier Gates, to include drive assemblies and all related electrical equipment (safety warning lights, etc.)
6. All traffic signal bases, traffic signal poles, mast arms and related traffic signal fixtures.
7. Roadway lighting fixtures (High Pressure Sodium Type)
8. Emergency Auxiliary Generator, to include fuel tank, and related automatic control switch-over panel.

Mr. Rich Sawicki (732-528-9494) shall be notified a minimum of one (1) week prior to delivery of any item.
THE FOLLOWING IS ADDED:

When existing piles are removed, all shall be filled with sand. Prior to driving piles, the Contractor shall provide a certification to the engineer that all voids have been filled.

If required to provide adequate sight distance for the operator, the Contractor shall supply a temporary camera and monitor.

Clearing Site, Bridge includes complete removal of portions of the substructure units where such portions of the existing bridge lie wholly or in part within the limits of the proposed bridge in addition to all other removals

stated or shown on the plans. Complete removal of substructure units includes piles, sheeting and/or scour countermeasures. Scour countermeasures includes rock, concrete and all other debris adjacent to the substructure that may interfere with the construction of the proposed structure.

Special protective systems for the removal of bridges, culverts, and other structures shall be as follows:

1. **Temporary Shielding.** Temporary shielding for demolition and new construction shall include furnishing, installing, and removing a structural framing and barrier system. The system shall be supported from girders to provide an adequate and substantial temporary shielding system to protect vehicular, pedestrian, and railroad traffic from falling construction materials or other objects. The barrier system shall remain in place during the time that construction work is performed and until the work is completed and accepted.

   For deck replacement or new deck work, the temporary shielding shall seal the underside of deck and extend outside of the fascia stringers to enclose the soffits and parapets.

   For parapet removal and replacement or new parapet construction, an outrigging type of temporary shielding, which encloses the soffit and parapet, shall be used.

   The Contractor shall submit for approval detailed working drawings showing all elements of the temporary shielding system, including bonding and grounding over electrified rail lines, design calculations, and the sequence of operations thereof, signed and sealed by a Professional Engineer licensed in the State. Should the Contractor's operation or construction staging require it to install and remove the shielding more than once, no additional payment will be made.

   The traffic lanes and pedestrian areas below the areas where temporary shielding is being installed shall be closed, in accordance with the requirements of Section 617.

   The temporary shielding shall be designed to withstand a load of at least 0.8 psi or greater if heavier loads are anticipated and shall prevent small particles and dust from falling through.

   Bolted connections or welding between temporary shielding and bottom flanges of the beams shall not be permitted. Any materials dropped on the temporary shielding shall not be allowed to accumulate and shall be removed promptly.

   The selection of sizes, materials, their arrangements, and details shall be the Contractor's option and responsibility, but subject to approval by the Engineer.

   The Contractor shall obtain the Engineer's approval of the method, design, and details of the temporary shielding system that the Contractor intends to use for the protection of traffic. No construction work shall be performed above traffic before such approval.

   Temporary shielding for Route 70 over the Manasquan River is required over the channel and areas of work.

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**201.11 Method of Measurement.**
THE FOLLOWING IS ADDED:

Excavation or the use of any type of sheeting that is required for the removal of the structure, or when such sheeting is to remain for planned new construction that is at the same location of the removal, will not be measured. Payment shall be included in the bid price for "Clearing Site, _____".

**201.12 Basis of Payment.**
THE SECOND PARAGRAPH IS CHANGED TO:

Payment for the Pay Item "Clearing Site" in excess of $550,000.00 will not be made until Completion.
THE FOLLOWING IS ADDED AFTER THE THIRD PARAGRAPH:

Payment for the Pay Item "Clearing Site, Bridge (Structure No. 1511-150)" in excess of $1,291,000.00 will not be made until Substantial Completion.

Payment for the Pay Item "Clearing Site, Structure (Fender)" in excess of $71,000.00 will not be made until Substantial Completion.

Separate payment will not be made for the temporary camera and monitor and all costs shall be included in the price bid for the item "Clearing Site, Bridge (Structure No. 1511-150)

## SECTION 202 - ROADWAY EXCAVATION

**202.04. Excavation.**

THE FOLLOWING IS ADDED:

All excavated materials must be disposed of at an approved site. Under no circumstances is excess material to be disposed of in wetlands, transition area wetlands, stream corridors, or other environmentally sensitive areas.

**202.09 Milling of HMA.**

**2. Construction Requirements.**

THE FOLLOWING IS ADDED AFTER THE NINTH PARAGRAPH:

Milled areas shall not be left unpaved for longer than seventy-two (72) hours, unless approved by the Engineer.

**202.15 Basis of Payment.**

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH.

Separate payment will not be made for Sawcutting when used with the Pay Items "Joint Removal" or "Removal of Concrete Base Course and Concrete Surface Courses".

## SECTION 203 - EMBANKMENT

**203.08 Control Fill Method.**

**A. Control Strips.**

**4. Procedure.**

THE LAST SENTENCE OF THE FOURTH PARAGRAPH IS CHANGED TO:

Density of the control strip will be determined according to AASHTO T 191 or AASHTO T 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

**B. Embankment Compaction.**

THE THIRD PARAGRAPH IS CHANGED TO:

The density of such inaccessible areas will be determined from the average of five randomly located measurements according to AASHTO T 191 or AASHTO T 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

**203.10 Density Control Method.**

THE LAST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The compacted density of embankments will be determined by taking the average of a minimum of five randomly located measurements for each 1,000 cubic yards placed according to AASHTO T 191 or AASHTO T 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

THE FOLLOWING IS ADDED TO THIS SECTION:

## GEOGRID REINFORCEMENT

**Description**.This work shall consist of furnishing and installing geogrid reinforcement to the lines and grades designated on the construction drawings.

## Materials

The geogrid reinforcement shall be a uniaxially or biaxially oriented polymer grid structure composed of polypropylene, polyester, or high density polyethylene.

The joints at the crossover points of the grid elements must be integrally connected in such a manner that elements will not separate under handling and construction activities, nor under stress levels and environmental conditions anticipated over the life of the structure.

The geogrid to be used shall meet or exceed the following minimum property values (1):

| DIRECTION: | PRINCIPAL | MINOR |
|---|---|---|
| T-DESIGN LONG TERM (2): | 1000 LBS/FT @ 10% STRAIN (15 kN/m) | N/A |
| T-ULTIMATE (3): | 2600 LBS/FT (39 kN/m) | N/A |
| T-ALLOWABLE (4): | 1000 LBS/FT (15 kN/m) | N/A |
| PULLOUT RESISTANCE (5): | 1500 LBS/FT (22 kN/m)<br>(NORMAL STRESS = 140 PSF) (6.7 kPa) | N/A |

(1) All numerical values represent minimum average roll values required in the designated direction.

(2) The principal direction is the direction of the grid to be placed perpendicular to the embankment side slope (whether cross or machine direction), which will be determined by the length, width and strength in both directions of available grids. The contractor shall indicate in writing the dimensional characteristics of the grid selected and the proposed placement details.

(3) T-ULTIMATE represents the geogrid strength tested in accordance with ASTM D-4595.

(4) T-ALLOWABLE is the strength extrapolated to a minimum 75 year design life based on creep strength, aging degradation, chemical and biological effects, and the influence of construction site damage. The contractor shall present evidence from the manufacturer in the form of creep tests (minimum of 1000 hours), durability data, and chemical and biological compatibility test information on the grid polymer to substantiate that the product meets the allowable strength requirement.

(5) The pullout resistance in the principal direction must meet or exceed the specified value under the indicated normal stress and a 3 foot (1m) embedment length in the soil material to be used for embankment construction.

For each consignment, the contractor shall furnish a sample of the geogrid and two copies of a certificate signed by a legal authorized officer of the geogrid manufacturer certifying that the product meets the requirements of this specification prior to commencing construction. Proof of test results shall be submitted with the certificates. At the direction of the engineer, at least two weeks prior to construction, the contractor shall provide suitable samples of the geogrid taken from the actual rolls which will be delivered to the site so that the engineer may perform independent tests to check the material properties. Any geogrid materials which are found not to be in compliance with this specification shall not be used on this job. The engineer's representative will be present at the site during installation and the engineer reserves the right to collect samples periodically for confirmation testing.

## Construction

After delivery to the site, all geogrid material shall be protected from mud or other materials which may affix themselves to the geogrid.

The geogrid shall be placed at the levels shown on the plans, and the engineer shall observe all geogrid placement. The geogrid shall be laid at the proper elevation with the principal strength direction oriented perpendicular to the embankment slopes as shown on the plans or as directed by the engineer. The geogrid shall be pulled taut to remove wrinkles or folds and secured in place with staples, pins, backfill, or as approved by the engineer.

Adjacent geogrid sheets shall be placed with their edges perpendicular to the embankment side slopes touching (butted edge to edge).

Parallel to the embankment side slopes, edges of adjacent geogrid sheets shall be mechanically fastened such that the connections meet the principal strength design requirements. Alternatively, continuous sheets of geogrid shall be used.

Fill material shall be placed on top of the geogrid and compacted in lifts as indicated on the plans, and in the standard specifications and applicable special provisions. All fill materials shall be placed, spread and compacted in such a manner that does not result in the development of wrinkles in and/or movement of the geogrid. No construction equipment shall be allowed to operate directly on the geogrid. A minimum fill thickness of 12 inches

(300mm) shall be maintained between the tracks and wheels of construction vehicles on the lift directly above the geogrid at all times. Turning of vehicles on the lift directly above the geogrid shall be kept to a minimum and sharp turns (45 degrees or greater) will not be allowed. Sudden braking shall also be avoided. The contractor shall be responsible for any damage to the geogrid resulting from his method and any damaged geogrid shall be replaced at the direction of the engineer and at the contractor's expense.

**COMPENSATION**

**Method of Measurement**.

Geogrid reinforcement will be measured by the square yard. The total quantity shall be computed based on the total area of geogrid shown on the construction plans, excluding the area of geogrid used in overlaps. Separate payment will not be made for geogrid reinforcement placed outside the lines shown on the plans.

**Basis of Payment.**

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| GEOGRID REINFORCEMENT | SQUARE YARD |

## SECTION 204 – BORROW EXCAVATION

**204.03 Construction Requirements.**

THE THIRD SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

A minimum of two field density tests will be taken according to AASHTO T 191 or AASHTO T 310 (Direct Transmission Method) on each compacted layer at each substructure unit, except that only one of the referenced methods will be used on the Project.

## SECTION 206 – FOUNDATION AND BRIDGE EXCAVATION

**206.01 Description.**

THE FOLLOWING IS ADDED:

Precast Concrete Cofferdams shall consist of fabricating, delivering and erecting precast concrete cofferdams for pier footings. Cofferdams will serve as a driving template for pile driving, formwork for pier footings, and will allow dewatering for footing construction.

Based on the preliminary analysis the classification of regulated waste is arsenic and beryllium.

**Foundation Excavation, Regulated Waste.** The work shall include the excavation, handling and stockpiling of regulated waste except as provided for in Subsection 206.07 and 206.11. The term 'Regulated Waste' as used shall mean Regulated Waste and Regulated Waste, Hazardous as appropriate. This work requires site-specific Health and Safety Requirements.

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**Foundation Excavation, Riverbed.** This work shall include the excavation, handling, stockpiling, reuse on-site and disposal. All riverbed material is potentially salt laden material. The disposal of this material shall comply with the plan, specifications, Federal, State and local law, rules, and regulations, the waste management plan of the district of origin, and Subsection 202.13.

**Off -Site Management of Regulated Waste.** This work shall include the loading and off-site transport, and disposal of Regulated Waste and Regulated Waste, Hazardous designated by the Engineer as excess, unusable or unsuitable material to the project. The disposal, recycling or treatment of Regulated Waste and Regulated Waste, Hazardous shall be in accordance with these specifications, the Material Handling Plan, Federal and State laws,

rules, and regulations and local laws, and the waste management plan of the district of origin. The references to Regulated Waste hereinafter shall mean Regulated Waste and Regulated Waste, Hazardous as appropriate. This work shall also include developing and implementing a Materials Handling Plan (MHP) for Regulated Waste encountered, moved, and disposed and/or recycled during construction.

**Sampling, Analysis, Disposal And Recycling for Regulated Waste.** This work will consist of sampling and testing as well as transport and disposal of the samples.

**Testing Riverbed Sediments for sodium and chlorides.** This work will consist of sampling and testing riverbed material for sodium and chlorides and disposal of the samples..

**206.07 Excavation.**

THE FOLLOWING IS ADDED:

All excavated materials must be disposed of at an approved site. Under no circumstances is excess material to be disposed of in wetlands, transition area wetlands, stream corridors, or other environmentally sensitive areas.

The Contractor shall provide all personnel, materials and equipment needed to undertake excavation as required to complete the work in a safe manner that is protective of human health and the environment. Excavation of Regulated Waste shall be performed with equipment of suitable size and compatible with site conditions. All equipment shall comply with and shall be operated in accordance with all applicable regulations.

The Contractor shall handle all excavated material in a manner that protects site personnel, the public, and the environment in accordance with all applicable federal, state, and local laws and regulations. Prior to any excavation of regulated waste the Contractor shall develop a Site-Specific Health and Safety Plan (HASP) in accordance with 29 CFR 1910, 29 CFR 1926 and the Site Specific Health and Safety Requirements specified herein.

**Site-Specific Health and Safety Requirements.**

The documentation and environmental information provided by the NJDOT is for information purposes only. The Contractor is responsible for appropriate interpretation of the information. The Contractor shall perform a hazard assessment of each proposed work task and make an independent evaluation regarding the appropriate level of health and safety requirements.

This work shall consist of the Contractor preparing, submitting and implementing a Site-Specific Health and Safety Plan (HASP) in accordance with all applicable health and safety requirements for work in and with contaminated soil, sediment and water. The Engineer shall review all submittals for compliance with the health and safety requirements. Excavation shall not be commenced until the Engineer's review has been completed as evidenced by written comment and acceptance as to completeness and compliance with these specifications. The Engineer will not approve the plan. However, acceptance of the plan by the Engineer implies only that at the time of review, the Engineer was not aware of any reasons to object to the plan. The acceptance of the plan, by the Engineer, does not relieve the Contractor of any responsibilities under the contract.

The Contractor shall employ a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP) to develop and oversee implementation of the Contractor's HASP. The CIH/CSP shall prepare the HASP to protect the Contractor's employees, the subcontractor’s employees, NJDOT employees and consultants, and the public from contamination present in the areas requiring excavation as designated on the construction plans. The HASP shall be prepared in accordance with all applicable local, state, and federal rules and regulations, including the health and safety requirements of OSHA 29 CFR parts 1910 and 1926.

The CIH/CSP shall review the site specific data and address the proposed activities to the level of detail as needed to ensure that site specific data, appropriate regulations, and a description of the site conditions are incorporated into the HASP. The Contractor shall comply with all the requirements of the accepted HASP during the excavation, handling, stockpiling, disposal, or recycling of regulated wastes.

The HASP as needed shall describe workplace and emergency procedures to be followed so that this project may be constructed in a safe manner. The HASP shall govern all facets of the project constructed and encompass the activities of all persons who enter and/or work on the site. The HASP shall incorporate procedures that conform to all federal, state, and local regulations pertaining to employee working conditions where appropriate, National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), US Coast Guard, US Environmental Protection Agency (USEPA), and New Jersey Department of Environmental Protection (NJDEP).

The HASP shall require that a health and safety designate monitor the working conditions during all excavation procedures and during the handling of regulated wastes to ensure conformance with the accepted HASP. The CIH/CSP shall evaluate the need for air monitoring during excavation and loading operations in Regulated Waste. The air monitoring program shall, if deemed necessary by the CIH/CSP, be implemented by the CIH/CSP or an assigned designate suitably trained and approved by the CIH/CSP for the work required. The CIH/CSP shall include in the HASP applicable training and qualifications documentation for him/her self and each health and safety designate.

The Contractor shall provide initial and annual training and medical monitoring for all contractor employees scheduled to work in/with contaminated soil/water and per the Engineers request up to ten (10) state employees and/or their authorized representatives as per OSHA 29 CFR 1910. The initial training for state employees and/or their authorized representatives shall be provided one (1) month prior to any excavation.

The Contractor shall deliver four (4) copies of the HASP and a listing of the health and safety personnel prior to clearing site to the Engineer for review and acceptance at least one month prior to beginning excavation. No work on the site shall be permitted until the HASP has been submitted, reviewed and accepted by the Engineer. The Contractor shall be responsible for implementing the HASP submitted to and accepted by the Engineer. The Contractor shall deliver original logs and reports related to the HASP to the Engineer on a weekly basis.

**206.08 Cofferdams**

THE FOLLOWING IS ADDED:

Unless otherwise stated, all provisions of Sections 501, 502, and 914 shall apply in the furnishing of precast concrete cofferdams, HPC.

Materials and methods of construction that are used in the furnishing of precast concrete cofferdams and that are not specifically covered on the Plans and in these Specifications shall conform to the AASHTO LRFD Bridge Design Specifications or to the AASHTO Standard Specifications for Highway Bridges, whichever is applicable. In lieu of the applicable AASHTO Specifications, the current ACI Manual of Concrete Practice and the current PCI Precast Prestressed Bridge Design Manual shall be adhered to.

The concrete shall conform to Subsection 914.02 for substructure protection concrete.

The requirements specified in Section 914 for Class A concrete shall be adhered to in the fabrication of the precast concrete cofferdams, HPC. However, coarse aggregate for such concrete shall be washed gravel or broken stone of argillite, granite, gneiss, quartzite, or trap rock conforming to the requirements of Section 901.

Architectural treatments shall be as shown on the plans. All reinforcement steel shall be epoxy coated.

An epoxy waterproofing seal coat shall be applied to the exterior surfaces of the precast concrete cofferdams at the plant prior to shipping. The epoxy waterproofing seal coat shall conform to Subsection 912.07 except that the color shall be clear.

Design calculations and working drawings for precast concrete cofferdams shall be submitted according to section 105.04. Erection details shall be complete in every detail including handling points, joint seal details, section lengths and the method of installing the units. Additionally, the working drawings shall indicate the profiles and dimensions of all precast units, lifting loads of all components and steel reinforcement layout.

The requirements stated in Subsection 503.07 B. shall be followed for the erection process.

The fabricator of precast concrete structures shall be certified by the PCI or the NPCA to the category of applicable work. The certification will be maintained during production of items for the Project. A copy of the current field audit report shall be submitted to the Department's Bureau of Materials before the start of production. The fabricator shall provide an Engineer's office according to Subsection 502.03, Subpart E.

**206.11 Excess or Unsuitable Material.**

THE FOLLOWING IS ADDED:

A. **Foundation Excavation, Regulated Waste.**

**Stockpiling Regulated Waste.** The Contractor shall provide all personnel, materials and equipment needed to properly store (and dewater, if necessary) Regulated Waste in temporary stockpiles. If needed, any temporary stockpile(s) shall be located at area(s) within the project limits selected by the Contractor and approved by the Resident Engineer. Regulated Waste, not suitable for construction activities and/or reuse, shall not be stockpiled for more than 180 days. Regulated waste subsequently classified as hazardous shall be properly stage and removed within 90 days of excavation.

Stockpiles shall only be placed on dry areas on a layer of minimum 10mils thick PVC sheeting or similar, as approved by the Engineer and contained with hay bales or silt fence placed continuously at the perimeter of the stockpile(s). All joints in the underlying PVC sheeting shall overlap with a minimum of 300 millimeters at the ends. Stockpile shall be constructed so that heights shall not exceed 4.5 meters, nor with sideslopes steeper than one vertical and two horizontal. The Contractor shall segregate material of differing types and degrees of contamination so as to prevent cross-contamination of uncontaminated material.

The Contractor shall provide protection for the regulated waste stockpile to prevent the run-on of stormwater, migration of contaminants, dusting, erosion and unauthorized contact. Stockpiles shall be covered with PVC sheeting of the same thickness. The sheeting shall be secured in place with tie downs and/or heavy objects such as concrete blocks at the end of each workday and during adverse weather conditions. All joints in the cover shall have a minimum 300 millimeters overlap and securing materials shall be placed along the joints such that the cover will not be opened by wind action.

The Contractor shall be responsible for the proper protection and maintenance for the regulated waste stockpile and embankment until completion of the work and acceptance by the Engineer. The Contractor shall maintain the sheeting as needed to repair damage and replace displaced cover sheeting. At the direction of the Engineer, the Contractor shall remedy any observed deficiencies in the cover and sediment barrier surrounding the temporary stockpile or embankment as soon as practicable, including but not limited to the removal and disposal of accumulated sediments behind the sediment barrier, to maintain satisfactory protection, and as otherwise needed to prevent contamination migration or exposure.

Drainage shall be controlled with hay bales, placed continuously at the perimeter of the stockpile(s), PVC cover and silt fence such that run-on and run-off from the regulated waste stockpile(s) are mitigated. Decant from the dewatering of sediments shall be in accordance with the Pollution Prevention and Control Plan (described herein Subsection 212.06).

**Soil/Sediment Usage Tracking Log.** The Contractor shall monitor and record on Daily Soil/Sediment Tracking Logs the source location, type, quantity, and characteristics of Regulated Waste excavated, stockpiled, and. The Contractor shall submit a Daily Soil/Sediment Tracking Log to the Engineer for each workday involving excavation, stockpiling, transport and disposal of regulated waste. The Daily Soil Tracking Log shall contain, at a minimum, the following information:

A) Date,

B) Location(s) of excavation and placement of material,
C) Volume of regulated waste removed, and
D) Name(s) and signature(s) of the Contractor representative(s) responsible for preparing and executing the Usage Tracking Log.

Copies of Daily Soil/Sediment Tracking Logs shall be submitted to the Engineer on a weekly basis. The Engineer will not approve any progress payment invoice if the required Daily Soil/Sediment Tracking logs have not been submitted.

**Materials Handling Plan** shall consist of developing and implementing a Plan (MHP) for Regulated Waste encountered, moved, and disposed and/or recycled during construction. The MHP shall explain the Contractor's planned techniques to be used in managing Regulated Waste so as to protect workers, the Resident Engineer and his representatives, visitors, the public and adjoining property owners against uncontrolled exposure to Regulated Waste, plus to prevent uncontrolled release of Regulated Waste to the environment.

The Contractor shall prepare and submit for Engineer's approval a MHP prior to any excavation. The MHP shall detail standard operating procedures for excavation, stockpiling, transporting, sampling and analysis, measurement, transportation, and disposal of riverbed sediment and hazardous and regulated waste. The Contractor shall make all necessary modifications to the MHP that result from comments given by the Engineer and the Department. The Contractor shall perform planning, administrative and control functions required in implementing the MHP. The MHP shall be in full compliance with the Specification. The Contractor shall implement the MHP in accordance with the contract documents.

The Contractor shall not commence work activities governed by the MHP until the Engineer has given written acceptance of the MHP. The Contractor shall submit the MHP to the Engineer for review and acceptance at least one month prior to commencing excavation.

The Contractor MHP shall include at a minimum: details of current certification, permits, insurance types and levels of coverage; qualifications of the transportation and receiving facilities; the types of equipment to be used in transporting regulated waste; proposed route(s) to disposal facilities and weighing facilities; waste characterization forms, sampling logs and analyses reports; transport manifests; and waste disposal documentation forms from the receiving facility.

The Contractor shall provide periodic reports documenting the excavation, stockpiling, sampling, off-site management and on-site placement of Regulated Waste. The periodic reports shall be mailed to the Engineer by the tenth calendar day of each month. The periodic reports shall provide the location and date(s) of excavation, stockpiling, sampling, off-site management, and placement of regulated Waste. The periodic reports shall explain any changes to or differences with construction plans. The periodic reports shall also include dates of planned excavation, sampling and off-site management of Regulated Waste for the coming months.

The contractor shall provide a final report documenting the Management of Regulated Waste, including the location and date(s) of excavation, stockpiling, sampling, off-site management, and on-site placement of Regulated Waste. The final report also shall any plans and depicting placement of Regulated Waste. The Contractor shall deliver four paper copies and one digital copy of the final report to the Engineer within one-month of completing all Foundation Excavation, Regulated Waste, Off-Site Management of Regulated Waste.

B. **Foundation Excavation, Riverbed**

**Stockpiling of the Salt Laden Material.**. The material shall be stockpiled and tracked in a manner identical to that already indicated for Regulated Waste.

**Disposal.** Salt Laden Material shall be disposed of in accordance with the Material Handling Plan described earlier and the solid waste management plan developed by the solid waste management district of origin.

Following are the reuse/disposal options and constraints.

A.) Reuse Onsite -If possible, Salt Laden Material will be reused onsite in accordance with Section 203 except within three feet of the bottom of topsoil.

B.) Reuse Offsite -Salt Laden Material may be reused offsite with the following constraints:

1). Salt Laden Material shall not be placed in wetlands, wetlands transition areas, floodplains, stream corridors, or other environmentally sensitive areas.

2.) Salt Laden Material will not be placed in offsite upland areas.

3.) The level of salt in the Salt Laden Material shall not exceed the level of salt at the offsite area at which the material will be placed.

4.) Prior to removing any Salt Laden Material from the Project site, the Contractor shall provide in writing to the Resident Engineer the location where the material will be placed. Written permission of the property owner(s) on whose property the material is to be placed shall be obtained by the Contractor and a copy shall be furnished to the Resident Engineer. Once the material leaves the Project limits, the Contractor is the owner of the material, and the Contractor shall be solely responsible for causing the material to be placed in a manner and at a location that is consistent with all applicable Federal, State and local requirements, including any permits that may be issued for the Project. The Contractor shall be liable for any violations that occur directly or indirectly as a result of the Contractor's failure to comply herewith. If the disposal of Salt Laden Material results in a violation notice from any governmental authority, the Contractor shall immediately pursue corrective action. The Contractor shall hold harmless the Department for any violation incurred as a result of improper disposal of materials. If the Contractor fails to correct the violation to the satisfaction of the governmental authority which issued the violation notice, the Department may initiate measures to eliminate the violation and all costs incurred by the Department will be deducted from any moneys due or that may become due to the Contractor.

C. **Off-Site Management of Regulated Waste.**

**Environmental Sampling and Testing.** The Contractor shall provide all personnel, material and equipment needed to transport and dispose/recycle all Regulated Waste generated on the project in accordance with Federal and State laws, rules, and regulations and local laws, the waste management plan of the district of origin and Subsection 201.10.

The Contractor shall be solely responsible for locating and contracting with appropriate hauler(s) and disposal facility(ies) for the Regulated Waste directed to be removed in accordance with Federal and State laws, rules and regulations and local laws. The Contractor shall prepare and submit all documentation to obtain all Federal, State or local approvals and fees necessary for disposing of regulated waste. The Contractor shall ensure that the waste disposal facility(ies) proposed for receipt of the material is (are) properly permitted to accept the classification of Regulated Waste.

The Contractor shall submit to the Engineer, results of waste sampling and analysis, waste facility applications and acceptance documentation, and fee payment requirements at least two weeks prior to planned removal of Regulated Waste. The Contractor shall submit to the Engineer a bill of lading (for ID-27 waste) or a hazardous waste manifest (for hazardous waste) for each truckload of Regulated Waste removed from the site. The bill of landing and/or waste manifest form shall present the following information:

Transport subcontractor name, address, permit number and phone number.
Type and quantity of waste removed.
Weight of vehicle with weigh slip.
Recycling or disposal facility name, address, permit number and telephone number.
Date removed from site.
Signature of transport vehicle operator.
Waste manifest number.

A representative of the Engineer will sign all waste manifests and/or bill of loading as the generator of the waste. The Contractor shall submit to the Engineer a copy of all waste manifests of Regulated Waste by the end of the day that the truck leaves the site.

All vehicles leaving the site with Regulated Waste shall be inspected by the Contractor to ensure that no excess soil adheres to the wheels or under carriage of the vehicles, and securely covered and equipped to prevent leakage of water. In the event of leakage of soil or water to the public roads, the Contractor shall immediately clean the road to restore it to the original condition and immediately notify the Engineer.

The licensed hauler shall transport the Regulated Waste to the disposal/recycling facility with no unauthorized stops in between, except as required by regulatory authority. The hauler shall use appropriate vehicles and operating practices to prevent spillage from occurring during transport. Regulated Waste shall not be transported over public roads if they contain free liquid or are sufficiently wet to be potentially flowable during transport.

The Contractor shall obtain appropriate documentation of disposal facility acceptance of the Regulated Waste and provide a copy of the documentation, including the weight ticket slips, to the Engineer and the County of origin within ten working days of waste acceptance at the disposal facility.

Should any problems arise regarding the facility chosen to accept the Regulated Waste for off-site management that would require the return of waste, or should such facility have violated any environmental regulation which may result in any regulatory enforcement action, the Contractor shall immediately notify the Engineer in writing of such a situation. The Contractor shall propose an alternate disposal facility, and obtain the written approval of the Engineer for off-site management at such facility.

The disposal of all Regulated Waste shall be in accordance with the Material Handling Plan, Federal and State laws, rules and regulations and local laws and the waste management plan of the district of origin.

The NJDOT will provide the Contractor with a USEPA Hazardous Waste Identification Number for the project containing Hazardous Waste.

D. **Sampling and Analysis for regulated waste characterization and disposal and/or recycling.**

All sampling, testing and data management procedures shall comply with current versions of the NJDEP Field Sampling Procedures Manual, NJDEP Technical Requirements for Site Remediation, NJDEP Management of Excavated Soils Guidelines, Appendix 1 of the NJDEP Waste Classification Form and EPA requirements.

Where required by the Contractor's disposal facility, the Contractor shall collect and analyze for additional parameters necessary for off-site disposal.

**Environmental Sampling and Testing.** The Contractor shall provide all personnel, materials and equipment needed to properly characterize excavated Regulated Waste material as required for disposal/recycling facility approval. The Contractor shall submit as part of the Material Handling Plan described herein, a sampling analysis section for characterizing the Regulated Waste for off-site disposal in accordance with applicable Federal, State and Local laws, rules and regulations: or according to the disposal facility accepting the waste.

The Contractor shall submit as part of the sampling and analysis section, the name, address and telephone number of the contact for the Contractor's proposed environmental laboratory and the name and experience of the proposed environmental sampling technician. The use of a proposed environmental laboratory and proposed environmental sampling technician are subject to review and acceptance by the Engineer.

The Contractor shall provide all personnel, equipment and ancillary services required to collect, transport and analyze environmental samples required for proper characterization of the material. All sampling, testing and inspections conducted in areas containing potential regulated waste shall be performed in accordance with the site-specific HASP in Subsection 202.04.

**E. Testing Riverbed Sediments for Sodium and Chlorides.**

The salt concentrations shall be determined by analysis at a certified lab. Testing will be conducted for sodium (SW846-Method 7770) and for chlorides (SW846-Method 9056).

**206.12 Method of Measurement.**

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED AS FOLLOWS:

Foundation Excavation, Bridge Excavation, Foundation Excavation, Regulated Waste and Foundation Excavation, Riverbed will not be measured and payment will be made for the quantity in the Proposal adjusted for Change Orders except as provided for in Subsection 109.01.

THE FOLLOWING IS ADDED:

Off-site management of Regulated Waste, which includes the off-site transport and the disposal/recycling of Regulated Waste shall be measured by the ton. This will be verified by using certified weigh tickets.

Sampling, Analysis, Disposal and Recycling for Regulated Waste will be measured by the unit. Each unit will include all costs associated with planning, collecting, analyzing, and processing individual waste characterization samples as needed by regulatory authority and/or disposal/recyling facility to classify regulated wastes and obtain regulatory and/or facility approval for acceptance.

Testing riverbed sediments for sodium and chlorides will be measured by the unit. Each unit will include all costs associated with planning, collecting, analyzing, and processing individual waste characterization samples as needed to classify the sodium and chlorides and obtain facility approval for acceptance. This work will also include disposal of the samples.

Precast Concrete Cofferdams, HPC will be measured by the number of units.

**206.13 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Unit* |
|---|---|
| PRECAST CONCRETE COFFERDAMS, HPC | UNIT |
| FOUNDATION EXCAVATION, REGULATED WASTE | CUBIC YARD |
| FOUNDATION EXCAVATION, RIVERBED | CUBIC YARD |
| OFF-SITE MANAGEMENT OF REGULATED WASTE | TON |
| SAMPLING, ANALYSIS, DISPOSAL AND RECYCLING FOR REGULATED WASTE | UNIT |
| TESTING RIVERBED SEDIMENTS FOR SODIUM AND CHLORIDES | UNIT |

THE FOLLOWING IS ADDED:

No separate payment will be made for concrete, reinforcement steel, grout seal, dewatering, epoxy waterproofing seal coat treatment, sealing of pile openings and temporary supports used to erect the cofferdam.

Cofferdams will be paid for at the contract unit price complete and in place. Payment shall be full compensation for fabricating, delivering, and installing all cofferdams:

Thirty-five percent of the bid price for each unit of the pay item “Precast Concrete Cofferdams” will be paid upon acceptance of delivery of the cofferdam unit to the site.

Fifty-five percent of the bid price for each unit of the pay item "Precast Concrete Cofferdams" will be paid upon acceptance of the installation of each unit in its final location for driving of the pier piles.

Final payment of the entire bid price for each unit of the pay item "Precast Concrete Cofferdams" will be paid upon acceptance of the footing concrete in place.

## SECTION 207 – SUBSURFACE STRUCTURE EXCAVATION

**207.03 Bedding Materials.**
SUBSECTION HEADING IS CHANGED TO:

**207.03 Bedding and Backfill Materials.**

**207.03 Bedding and Backfill Materials.**
THE FOLLOWING IS ADDED:

Controlled Low Strength Material (CLSM) shall conform to Subsection 919.22

**207.04 Construction Requirements.**
THE FIRST PARAGRAPH IS CHANGED TO:

Before excavating, existing subsurface structures which may be affected by or interfere with the proposed construction shall be located. If directed, test pits shall be excavated to obtain the required information. Test pits or portions of a test pit shall be dug by hand when in close proximity to utilities or when directed. Excavation beyond that which is necessary to obtain the required information will not be measured for payment. Test pits shall be backfilled according to Subsection 203.06.

**1. Pipes and Culverts.**
THE FIRST PARAGRAPH IS CHANGED TO:

The width of trench shall be at least 1 foot – 6 inches greater than the outside diameter of the pipe or culvert. When the material at the bottom of the excavation is rock or other hard material, it shall be removed within 6 inches for reinforced concrete culvert pipe and high density polyethylene (HDPE) pipe, and 1 foot for corrugated metal, steel, or aluminum alloy culvert pipe outside the bottom of the pipe or culvert and the space backfilled with suitable material.

**207.05 Bedding for Pipes and Culverts.**
THE FIFTH PARAGRAPH IS CHANGED TO:

Bedding for corrugated aluminum alloy culvert pipe and HDPE pipe shall be placed as specified for Class B bedding.

**207.06 Backfilling.**
**A. Pipes and Culverts.**
THE ENTIRE SUBPART A. IS CHANGED TO:

Backfill to a height of 2 feet above the top of pipes and culverts, except underdrains, corrugated aluminum alloy culvert pipe and HDPE pipe, shall be made with excavated material free from stones or rock fragments larger than 2 inches in any dimension. Below this level, the backfill shall be placed in layers not more than 6 inches thick, and each layer shall be compacted with flat-face mechanical tampers. Backfill shall be worked into the haunch area and compacted for all pipe.

For HDPE pipe, backfill to a height of 2 feet above the top of the pipe shall be made with excavated material free from class IV or class V materials according to ASTM D2321, with stones or rock fragments no larger than 1½ inch in any direction. Below this level, the backfill shall be placed symmetrically on each side of the pipe in layers not more than 6 inches thick with each layer compacted with flat-faced mechanical tampers for all pipe.

Backfill to a height of 2 feet above the top of corrugated aluminum alloy culvert pipe shall be made with a granular soil with the gradation as specified in Subsection 207.03. Below this level, the backfill shall be placed symmetrically on each side of the pipe in layers not more than 6 inches thick, and each layer shall be compacted with flat-faced mechanical tampers.

All backfill more than 2 feet above the top of pipes and culverts, except underdrains, shall be made with excavated material and compacted in 6 inches layers as follows:

1. By vibratory soil compactors, if the backfill material is predominately sand or sand and gravel.
2. By flat-faced mechanical tampers, if the backfill material is not predominantly sand or sand and gravel.
3. Flat-faced mechanical tampers may be substituted for the vibratory soil compactors where the shoring and bracing of trenches or other special conditions make the use of vibratory compactors impractical.
4. Care shall be taken to avoid contact between the pipe and compaction equipment at all times. All damaged pipes shall be removed and replaced at no additional cost to the State.

The Engineer may direct compaction to be according to Subsection 203.10 except that the frequency of measurements may increase. If a hydrohammer or hoe-pak is used for compacting the backfill over the pipe, a minimum of 4 feet of cover over the pipe shall be provided.CLSM may be used as alternate backfill material when backfilling trenches for drainage pipe and utility conduit. Combining other backfill materials in the same trench as CLSM shall not be permitted. Mixing and placement of CLSM shall begin only when the ambient temperature is at least 30 °F. During placement, the CLSM mixture shall have a temperature of at least 41 °F and shall not be placed on frozen ground. The CLSM mixture shall be discharged directly from the truck into the trench to be filled with care taken to prevent the pipe from becoming displaced. After placement, the CLSM mixture shall be cured and protected to prevent damage from cold weather according to Subsection 405.14. CLSM shall not be used to replace pavement, base courses or drainage layers that form the structure of the roadway.

The special backfill in trenches for the underdrains shall be compacted by vibratory compactors. Earth backfill above the special backfill material shall be compacted as specified in Subsection 203.07.

Shoring, bracing, and sheathing shall be withdrawn as the backfilling proceeds. Compaction requirements shall not be compromised due to the removal of sheathing, shoring, trench boxes or other type of excavation support systems.

In rock cuts, the backfill shall be either broken stone or washed gravel.

## SECTION 212 – SOIL EROSION AND SEDIMENT CONTROL PLAN

### 212.06 Soil Erosion and Sediment Control Measures.

**H. Floating Turbidity Barrier**

THE FOLLOWING IS ADDED:

Floating Turbidity Barriers shall remain in place until all work is complete. They shall be removed upon completion of all work.

**J. Dewatering Basin.**

THE FOLLOWING IS ADDED:

The Contractor shall control all storm and ground waters removed from excavations in areas of Regulated Waste and groundwater so as to capture all free product and meet discharge requirements for permitted discharge to dewatering basin, surface water body or storm sewer system as selected by the Contractor. Following use, the discharge basin shall be backfilled using soils excavated during construction of the basin.

**Pollution Prevention and Control Plan.**

A Pollution Prevention and Control Plan (hereinafter referred to as PPC Plan) to prevent unpermitted discharge of contaminated storm water, ground water, sediments and/or free product during stormwater control, excavation and dewatering operations shall be developed..

The PPC Plan shall detail methods, personnel, equipment, and reporting requirements in preventing unpermitted discharge of contaminated sediment and water generated during stormwater control, excavation and dewatering operations. The PPC Plan shall comply with all Federal, state, and local laws, rules, and regulations relative to contaminated discharges. The Contractor shall submit the PPC plan to the Engineer for review and approval at least one month prior to beginning excavation.

The PPC Plan shall provide methods and equipment for collecting, pumping, treating, monitoring, and disposing liquids generated during storm water control, measures to prevent storm water run-on and runoff, dewatering of excavations, dewatering of sediments, decontaminating personnel and equipment, and storing fuels and chemicals. The PPC Plan shall detail water collection, treatment, monitoring, discharge activities, and reporting requirements. The PPC plan shall require that water collection, treatment, monitoring, and discharge activities, personnel and equipment, and relevant quantities shall be included in daily construction reports.

Water removed from excavations and decant water derived from contaminated soil/sediment shall be handled and treated such that when the water is discharged to the dewatering basin, it is done in accordance with all Federal, State and local regulations governing such discharges.

The Contractor shall maintain a PPC log of incidents and water collection, monitoring, and handling activities, and shall make the log available to the Engineer upon request. The PPC log shall note daily water removal, treatment and discharge volumes, effluent sampling activities and results, discharge or spill incidents, and sampling and reporting activities.

**212.06 Soil Erosion and Sediment Control Measures.**

THE FOLLOWING IS ADDED:

**K Concrete Washout Facility.** Design concrete washout facility to fully contain all concrete washout needs of the Work. Concrete washout facility may be portable or a basin that is lined with a minimum of 10-mil polyethylene sheeting and bermed to prevent escape of discharge. Submit a plan for concrete washout facility for approval to the engineer 10 days before the first concrete pour. Provide concrete washout facilities to prevent discharge from concrete trucks or equipment cleaning to surface or groundwater. Designate an area for concrete washout that is no closer than 50 feet from environmentally sensitive areas such as streams, wetlands, or other areas indicated on the plans. Use signs to designate concrete washout areas. Ensure that the washout area is in place before delivery of concrete to the site.

Ensure that concrete washout is limited to the designated areas. If the washout facility becomes 50 percent full, discontinue pouring concrete until the facility is cleaned out. Remove hardened concrete and properly dispose or reuse it as specified in Subsection 202.12. Allow slurry to evaporate or remove from site and dispose of it as specified in Subsection 201.10.

If a lined basin is used, replace the liner if it becomes compromised. Remove concrete washout facility when it is no longer needed. Restore the disturbed area.

No raw concrete shall come in contact with the water. All geotextile mattresses and grout conveyances shall be tightly sealed to prevent leakage of grout/concrete. Any grout/concrete that comes in contact with the water must be removed immediately No pumped water from grout/concrete operations may be discharged directly to the water. All pumped water shall be discharged to a holding facility and disposed of properly.

**L. Temporary Sediment Riser.** Temporary sediment risers, consisting of a vertical intake pipe, anti-vortex cap, and a horizontal discharge pipe, shall be installed in new basins at location detailed on the plans. Pipes shall be corrugated metal of the sizes indicated on the plans, and shall conform to Section 913.07. The intake pipe shall be embedded 4” into a 12” thick reinforced concrete footing. The discharge pipe shall be secured to the bottom of the basin to prevent movement and shall connect to the proposed drainage system via the outlet structure or directly to the proposed pipe.

Excavation for the construction of the footing shall conform to Section 207.

Each temporary sediment riser shall be maintained until such time that permanent vegetation is established within the respective basin.

**212.09**

THE FOLLOWING IS ADDED:

Concrete washout areas will not measured, and payment will be made on a lump sum basis.

Temporary sediment risers will be measured by the unit.

**212.10 Basis of Payment.**

THE FOLLOWING PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| CONCRETE WASHOUT FACILITY | LUMP SUM |
| TEMPORARY SEDIMENT RISER | UNIT |

# DIVISION 300 - BASE COURSES

## SECTION 301 - SOIL AGGREGATE BASE COURSE AND DENSE-GRADED AGGREGATE BASE COURSE

**301.05 Compaction.**
THE LAST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The in-place dry density of each compacted layer will be determined according to AASHTO T 191 or T 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

**2. Compaction Acceptance Testing.**
THE THIRD SENTENCE OF THE LAST PARAGRAPH IS CHANGED TO:

One density determination will be made at each of the selected locations using AASHTO T 191 or T 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

# DIVISION 400 - SURFACE COURSES

## SECTION 404 – HOT MIX ASPHALT (HMA)

**404.02 Materials.**
THE FOLLOWING IS ADDED TO LIST OF MATERIALS IN THE SECOND PARAGRAPH:

Polymerized Joint Adhesive……..908.08

**404.05 Plant Laboratory.**
ITEM 23. OF THE FIFTH PARAGRAPH IS CHANGED TO:

23. Microcomputer and workstation requirements shall be according to Subsection 106.06.

**404.06 Vehicles for Transporting HMA Mixtures.**
THE ENTIRE SUBSECTION IS CHANGED TO:

The mixture shall be transported from the mixing plant to the Project in trucks equipped with tight, clean bodies, which may be lightly coated with a soap or lime solution, or other such non-petroleum-based release agent. Under no circumstance shall a petroleum-based product be used as a release agent.

The trucks shall be permanently equipped with an airfoil that is capable at any speed or under any weather conditions to deflect air over the tarp and to prevent air from going under the tarp. The airfoil will be affixed no more than 2 feet in front of the tarp roll and be at least as high as the top of the tarp roll.

Each truckload shall be covered immediately after loading at the plant with a waterproof tarpaulin of such size to protect the mixture from the weather. The tarpaulin shall be able to withstand normal handling and placement temperatures of up to 400 ºF without endangering the structural integrity and serviceability of the fabric. The tarpaulin shall also comply with one of the following:

1. A heavyweight tarpaulin to completely drape the load. The heavyweight tarpaulin shall have a minimum weight of 18 oz./yd$^2$ and shall be a minimum of 2 feet wider and 4 feet longer than the truck body. The heavyweight tarpaulin shall securely meet or overlap the top of the tailgate and be securely held in place so as to prevent air from lifting the tarp during transport.
2. A tarpaulin equipped with side and back flaps sufficient to lap down outside along the sides and rear of the truck bed a minimum of 12 inches. The tarpaulin shall be secured by tie downs at a maximum of 5 feet spacing along the sides and rear of the truck.

The truck bodies shall be insulated or heated as necessary, to ensure delivery of the mixture at the specified temperature. Any truck that: causes excessive segregation of the mixture by its suspension or other contributing factors; leaks; causes delays; does not have an airfoil; or does not have an approved tarpaulin shall be removed from the work until such conditions are corrected and the truck is presented for inspection to the Engineer. The Engineer may require that all vehicles for transporting HMA mixture to be used by the contractor be made available for inspection at the plant laboratory prior to any shipments of materials.

**404.07 Materials Transfer Vehicle (MTV)**
THE ENTIRE SUBSECTION IS CHANGED TO:

The MTV shall independently deliver mixtures from the hauling equipment to the paving equipment. A paver hopper insert with a minimum capacity of 14 tons shall be installed in the hopper of conventional paving equipment when an MTV is used.

As a minimum, the MTV shall have a high capacity truck unloading system which will receive mixtures from the hauling equipment; a storage system in the MTV with a minimum capacity of 15 tons of mixture; and a discharge conveyor, with the ability to swivel, to deliver the mixture to the paving spreader while allowing the MTV to operate from an adjacent lane. In addition, the paving operation must contain a remixing system to continuously blend the mixture prior to placement. The remixing may be done by the MTV or in the paver hopper.

Use of MTV may not be necessary on all projects. Refer to the Special Provisions to determine if its use is either mandatory or optional.

**404.08 HMA Paver.**
THE FIFTH AND SIXTH PARAGRAPHS ARE CHANGED TO:

When wedge joint construction is required, HMA pavers shall be equipped with a sloped plate to produce a wedge edge at longitudinal joints. The sloped plate shall meet the requirements of Subsection 404.17.1.B and shall be attached to the paver screed extension.
THE SEVENTH PARAGRAPH IS DELETED.

**404.17 Spreading and Finishing.**
SUBPART 1. "LONGITUDINAL JOINTS" IS CHANGED TO:

1. **Longitudinal Joints.** All longitudinal joints shall be cleaned free from dust and coated before placing the HMA with a uniform application of a polymerized joint adhesive selected from the Department's approved products list. The polymerized joint adhesive material shall be applied at a slow rate to ensure an even coating thickness of an ⅛ of an inch over the entire joint face. For echelon paving the longitudinal joints need not be treated with the polymerized joint adhesive.

   The paving shall be done with the spring loaded end plates of the paver in the "down" position. When constructing the first lane, care shall be exercised in rolling so as not to displace the line and grade of the edges of the HMA. The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6 inches. The joint in the surface course shall be offset from the lane lines by 6 inches except for the centerline of a roadway in which the joint shall fall between the double yellow traffic stripe.

   Paving, compaction and the supply of material shall proceed at a uniform rate with minimal or no stopping.

   If a single paver does not spread the HMA material the entire width of the roadway, two pavers shall be used provided that the rate of production of HMA material can be maintained. The second unit shall follow within 300 feet of the first unit in echelon, so as not to permit cooling of the longitudinal joint between the two lanes. If echelon paving is to be utilized, the distance that the screed and end gate of the trailing paver shall extend over the uncompacted HMA layer behind the first paver shall be 1 inch or less. The inside end gate of the second paver must be set at the same level as the bottom of the screed plate of the first paver. Raking of the joint is not needed.

   A wedge joint shall be constructed when traffic is to be maintained and lift thickness is greater than $2^1/_4$ inches. A vertical edge joint will be permitted for lift thickness $2^1/_4$ inches or less when traffic has to be maintained. For lift thickness greater than $2^1/_4$ inches and traffic is not required to be maintained, a vertical edge shall be utilized.

   Longitudinal joints shall be constructed utilizing one of the following methods:

   **A. Vertical Edge Joint.** The paver shall be positioned so that in spreading, the HMA material uniformly overlaps the edge of the lane previously placed by 1 to 2 inches and shall be left sufficiently high to allow for compaction. In general, the height of the uncompacted HMA above the compacted HMA shall be $^1/_4$ inch for each 1 inch of compacted mix. The overlapped HMA material being placed in the abutting lane shall be tightly crowded (bumped) over the joint. Any material in excess of the 1 to 2 inch overlap shall be pulled away from the joint and removed instead of broadcasting onto the new mat. When compacted, the new mat at the joint shall be even or slightly higher (Maximum ⅛ of an inch) than the previously placed adjoining mat. If the newly compacted mat results in a depression at the joint of $^1/_8$ of an inch or more lower than the previously placed adjacent HMA layer, all paving operations shall cease until corrective action is taken by the Contractor to prevent reoccurrence. For all longitudinal joints that do not meet this requirement, the Contractor shall saw joints according to dimension guidelines of Subsection 404.19 and seal with an approved sealer.

   **B. Wedge Joint.** The sloped plate of the paver shall produce a wedge edge having a face slope of 3H:1V. The plate shall be so constructed as to accommodate compacted layer thickness of 2 to 4 inches. The bottom of the sloped plate shall be mounted 1 inch above the existing surface. The plate shall be interchangeable on either side of the screed. The Contractor shall maintain the wedge configuration under traffic conditions.

   All loose material shall be removed from the traveled way before opening to traffic. The rolling operation of the adjoining lane shall proceed as indicated in subpart A above, except

that care shall be taken to keep coarse aggregate away from the point where the wedge meets the surface of the previously placed lane.

To assure a true line, the paver shall closely follow lines or markings placed along the joint for alignment purposes. All longitudinal joints shall be constructed parallel to the centerlines within a tolerance of plus or minus 3 inches for every 100 linear feet. If this tolerance is not met, the mat shall be cut back to conform. The width and depth of overlapped material shall be kept uniform at all times. Overlapped material shall be luted back, pushing the material off of the cold HMA and onto the hot HMA mat directly over the joint. In no case shall excess material be broadcast across the new layer. All excess material shall be removed.

**404.18 Compaction.**

THE FOURTH PARAGRAPH IS CHANGED TO:

When compacting the longitudinal edge of the first lanes placed using the wedge joint, the breakdown roller shall not extend more than 2 inches over the top of the sloped face of the wedge joint. The Contractor shall submit a plan, to ensure material at the wedge edge is properly seated and loose material is removed, for the Resident Engineer's approval prior to the commencement of paving operations.

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

Care shall be taken to prevent lateral displacement of the unconfined edge during the compaction operation. The edge of the drums of vibratory or static wheel rollers shall extend over the free edge of the mat by at least 6 inches. When compacting the joint, while paving the adjacent lane, the roller shall be placed on the newly placed HMA and overlap the joint by a distance of approximately 6 inches.

THE FIFTH PARAGRAPH IS CHANGED TO:

Alternate trips of the roller shall be terminated in stops approximately 2 feet from the preceding stop. When paving in echelon, rollers compacting the mat behind the lead paver shall maintain approximately 6 inches of uncompacted material adjacent to the second paver. After mix from the second paver is placed against the uncompacted edge of the mat from the first paver, the rollers shall compact the HMA on both sides of the joint.

THE FOLLOWING IS ADDED AFTER THE ELEVENTH PARAGRAPH:

After compaction has been completed, the pavement shall be free of all visible defects such as segregation, bleeding, ruts, ridges, roller marks, cracking, tearing, raveling, open or segregated transverse or longitudinal joints, depressed or raised areas around manholes or raised areas around inlets in the Traveled Way or any other defects, as determined by the Resident Engineer. All visible defects shall be repaired to the satisfaction of the Resident Engineer at no additional cost to the State.

At the discretion of the Resident Engineer where it is deemed to be impractical to repair such visible defects, a payment reduction due to nonconformance will be applied according to Subsection 404.26.

**404.25 Method of Measurement.**

THE FOLLOWING IS ADDED AFTER THE SEVENTH PARAGRAPH:

Polymerized joint adhesive will be measured by the linear foot.

THE EIGHTH AND NINTH PARAGRAPHS ARE CHANGED TO:

Sealing of Cracks in HMA surface course will be measured by the linear foot.

Sawing and sealing joints in HMA overlays will be measured by the linear foot. Sawing joints in base or intermediate course will be measured by the linear foot.
THE SIXTH FULL PARAGRAPH FROM THE LAST IS CHANGED TO:

The basic asphalt price index will be the monthly asphalt price index published during the month of Advertisement.

**404.26 Basis of Payment.**
THE NINTH AND THIRTEENTH PAY ITEMS IN THE FIRST PARAGRAPH ARE CHANGED TO:

| | |
|---|---|
| SAWING JOINTS IN INTERMEDIATE OR BASE COURSE | LINEAR FOOT |
| CORE SAMPLES, HOT MIX ASPHALT | UNIT |

THE FOLLOWING NEW PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| POLYMERIZED JOINT ADHESIVE | LINEAR FOOT |

THE FOLLOWING PAY ITEM IS DELETED:

| | |
|---|---|
| SEALING OF CRACKS AND JOINTS IN HOT MIX ASPHALT SURFACE COURSE | LINEAR FOOT |

THE LAST PARAGRAPH IS CHANGED TO:

Separate payment will not be made for MTV, test strips, and quality control for compaction, including comparison cores, and nuclear density testing. All costs thereof shall be included in the prices bid for Hot Mix Asphalt Surface Course ___, Hot Mix Asphalt Intermediate Course ___, and Hot Mix Asphalt Base Course ___.

## SECTION 405 – CONCRETE SURFACE COURSE

**405.08 Mixing Concrete.**

**1. Mixing on the Project in Truck Mixers.**

THIS FIRST SENTENCE IN THE FIFTEENTH PARAGRAPH IS CHANGED TO:

Each batch shall be mixed not less than 50 revolutions at the rate of rotation designated as mixing speed.

**3. Transit Mixing.**

THE NINTH PARAGRAPH IS CHANGED TO:

Mixing shall begin immediately following the complete charging of the drum and continue for not less than 50 revolutions of the drum at the mixing speed recommended by the manufacturer of the truck mixer. Upon completion of at least the minimum number of mixing revolutions at the plant, the speed of the drum shall be reduced to the agitation speed recommended by the manufacturer.

THE LAST PARAGRAPH IS CHANGED TO:

Transit mix concrete will be rejected for any of the following reasons:

a. If the concrete is not discharged within the specified time limit after loading all ingredients into the drum;
b. If the indicator on the counter shows that the instrument has been turned off or tampered with;
c. If the non-resettable total revolution counter shows more than 300 revolutions;
d. If water has been added while the truck mixer is en route to the Project. Two-way telephone or radio communication between the site of the placement of concrete and the batching plant shall be provided.

# SECTION 406 – SUPERPAVE HOT MIX ASPHALT COURSES

**406.12 Air Voids Acceptance Plan.**
THE FIRST SENTENCE OF THE FOURTH PARAGRAPH IS CHANGED TO:

Each mixture in a given lot shall be compacted so that the combined percentage of material below 2.0 percent air voids or above 8.0 percent air voids shall be no more than ten percent.

THE SUBPART (2) IN THE FIFTH PARAGRAPH IS CHANGED TO:

(2) Compute Quality Index.
QL = ( $\overline{X}$ - 2.0)/S and QU = (8.0 - $\overline{X}$ )/S, where "Q" is the quality index.

**406.13 Surface Course Rideability Requirements.**

For this Project, the no payment reduction provisions shall govern.

**406.14 Thickness Requirements.**
THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Conformance to thickness requirements will be judged from the full depth cores taken for surface course air voids determinations evaluated according to Section 990, NJDOT B-4.

THE THIRD PARAGRAPH IS CHANGED TO:
Acceptance will be based on total thickness and thickness of the surface course.

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

Evaluation of the surface course will be performed solely to determine whether a remove-and-replace or an overlay condition exists, not for pay adjustment. To be judged acceptable, no more than 10.0 percent of the surface course shall be of deficient thickness as calculated by the procedure below.

Acceptance for surface course thickness will be based on the percentage of the lot estimated to fall below the specified thickness as follows:

(1) Compute the sample mean ( $\overline{X}$ ) and the standard deviation (S) of the N Test Results (X1, X2,..., XN):

$$\overline{X} = \frac{X1 + X2 + ... + XN}{N}$$

$$S = [(X1 - \overline{X})^2 + (X2 - \overline{X})^2 + ... + (XN - \overline{X})^2 / (N-1)]^{1/2}$$

If for any reason the number of available test results is different from N = 5 for initial testing or N = 10 for retesting, tables for the appropriate sample size are to be used for Step (3).

(2) Compute Quality Index.
QL = ( $\overline{X}$ – $T_{all}$)/S, where "Q" is the quality index and $T_{all}$ is the minimum allowable thickness from the following table:

**HMA Designation**

| Nominal Maximum Aggregate Size of Mix | Minimum Allowable Compacted Lift Thickness ($T_{all}$) |
|---|---|
| 9.5 MM | 1.0 Inch |
| 12.5 MM | 1.25 Inches |
| 19 MM | 2.0 Inches |

(3) Compute Percent Defective.

Using Table 914-5 for the appropriate sample size, determine the percentage of defective material (PD) falling below the allowable thickness associated with QL (lower limit).

(4) Retest.
If the initial series of N = 5 tests produces a percent defective value of PD ≥ 10, the Contractor may elect to take an additional set of N = 5 drilled cores at new random locations, as designated by the Engineer. The additional cores must be taken within 10 Working Days of the receipt of the initial core results. If the additional cores are not taken within the 10 Working Days, the initial core results (N = 5) will be used to determine acceptance. When additional cores are taken, Steps 1, 2, and 3 will be repeated using the combined data set of N = 10 test values to obtain the total PD estimate using Table 914-5.

(5) Removal and Replacement.
If the surface course fails to meet the acceptance requirement the Department will require removal and replacement of the lot, or milling and overlaying, at the Contractor's expense. When either replacement or milling and overlaying are done, the new courses are subject to the same requirements as the initial construction.

**406.15 Combined Pay Adjustment.**
THE ENTIRE SUBSECTION IS DELETED AND IS INTENTIONALLY LEFT BLANK:

**406.19 Basis of Payment.**
THE SECOND PARAGRAPH IS CHANGED TO:

Pay Adjustments for air voids, rideablity, and thickness will be made according to Subsections 406.12, 406.13, and 406.14, respectively.

THE LAST PARAGRAPH IS CHANGED TO:

Separate payment will not be made for MTV, test strips, and quality control for compaction, including comparison cores, Separate payment will not be made for MTV, test strips, and quality control for compaction, including comparison cores, and nuclear density testing. All costs thereof shall be included in the prices bid for Superpave Hot Mix Asphalt __ __ __ Surface Course, Superpave Hot Mix Asphalt __ __ __ Intermediate Course, and Superpave Hot Mix Asphalt __ __ __ Base Course.

# DIVISION 500 - BRIDGES AND STRUCTURES

## SECTION 501 - CONCRETE STRUCTURES

**501.01 Description.**

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

This work shall consist of the construction of portland cement concrete deck slabs, parapets, sidewalks, bridge monuments, precast concrete cofferdams, cast-in-place concrete for the pier caps and footings with the use of High Performance Concrete (HPC).

**501.02 Materials.**

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPHS MATERIAL LIST

High Performance Concrete ..... 914.02

Concrete in Structures, Footings, Class A HPC shall conform to the requirements for substructure protection concrete.

THE FOLLOWING IS ADDED:

All construction related hardware or materials that remain embedded in the concrete of the deck and precast units shall be epoxy coated.

In the production of HPC, in order to achieve the desired resistance to chloride penetration, an appropriate pozzalonic or other cementitious material; such as, silica fume, fly ash or ground granulated blast furnace slag shall be provided in the mix design.

Silica fume shall not be used as a sole material to achieve the desired resistance to chlorides. When used, silica fume's content shall be limited to a maximum of 5 percent of the total cement content and a proportion of fly ash or ground granulated blast furnace slag shall be included to obtain the resistance specified in 914.02 to chloride penetration. The fly ash and ground granulated blast furnace slag limitations specified in 914.02 may be increased in the fabrication of HPC.

The maximum water cement ratio shall be maintained at 0.40. In the fabrication of HPC, the cement content should not be increased for the purpose of achieving high early strength.

**501.07 Forms.**

**7. Permanent Steel Bridge Deck Forms.**

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

The use of permanent steel bridge deck forms shall conform to the following:

**a. Design.**

THE SEVENTH PARAGRAPH IS CHANGED TO:

The spacing (pitch) of the ribs (flutes) shall match the spacing of the bottom main reinforcement steel, except on curved girder structures and in the areas of bridge decks with a flared rebar pattern. In these locations, the pitch of the flutes may be independent of the bottom main reinforcement spacing, and the forms may be dropped as necessary to achieve the minimum 1 inch concrete cover between the main reinforcement steel and the form. When the forms are dropped, additional dead load shall be accounted for in the design. Approval from the Engineer to drop the forms shall be obtained before construction of the deck begins.

**b. Construction.**

THE FOLLOWING IS ADDED AT THE END OF THE SECOND PARAGRAPH:

Joints between the forms should be lapped in the direction of concrete placement.

**501.11 Limitations of Placing.**
THE SECOND SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

In no case, during mixing and placement, shall the temperature of the concrete be less than 60 or more than 90 degrees F.

**501.12 Placing Concrete.**

**5. Deck Slabs.**
THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

**a. General Provisions.** The following provisions shall be adhered to in all concrete deck slab construction.

THE 21 ST PARAGRAPH IS CHANGED TO:

When the concrete placing within any complete unit (i.e., for trusses, arches, continuous or cantilevered unit) is to be divided, the placing shall be made and finished in the numbered sequence shown, beginning with the lowest number. All sections having the same number shall be placed before sections of higher number. The sequence of placing for sections having the same number shall be optional. No deck section shall be placed until all previously placed concrete within the complete unit has cured for 72 hours. This requirement may be waived if the succeeding section(s) can be completed within four hours after the start of the initial placement of section(s) of any given unit for that day. A written request to waive this requirement shall be submitted to the Engineer for approval. This requirement may not be waived for deck slabs on prestressed concrete beams that are continuous for live load. The numbered sequence shown on the Plans shall be adhered to

THE FOLLOWING IS ADDED:

**b. High Performance Concrete (HPC) for Deck Slabs, Sidewalks, Bridge Monuments, Concrete Railings and substructure Protection.** HPC is defined as concrete that meets special performance and uniformity requirements that cannot always be obtained by using conventional ingredients, normal mixing procedures and typical curing practices. The furnishing of HPC shall conform to the requirements of 914.02.

(1) The Contractor is advised that curing of the HPC deck slab shall be performed in accordance with the provisions of Subsection 501.17. Upon completion of the 7 day wet curing period, the HPC deck slab shall be further cured according to the provisions of Subsection 405.14, Subpart 1.

(2) The finishing machine equipment shall be set up so that the HPC is placed only 6 to 8 feet ahead of the machine.

**15. Pumped Concrete.**
THE FOLLOWING IS ADDED:

As per the provisions of 914.04, fresh mixed concrete shall be sampled according to the requirements of AASHTO T 141. Samples shall be taken at the discharge of the concrete pump. If the Engineer believes that this is not a feasible, the pump shall be calibrated to calculate slump and air entrainment losses. These losses shall be deducted from the values as sampled from the concrete truck.

**19. Corrosion Inhibitor Admixture.**

PARAGRAPH C IS DELETED

THE FOLLOWING SUBPART IS ADDED:

**21. Mass Concrete.** Mass concrete is the placement of any large volume of cast in place concrete or precast concrete with dimensions large enough to require that measures be taken to cope with the generation of heat and attendant volume change, so as to minimize cracking.

A Mass Concrete member is defined as any concrete placement where each measured dimension of a concrete component exceeds 3 feet and the ratio of its volume to surface area is greater than 1 foot. The surface area will include all of the cumulative area of all surfaces of the concrete component being considered including the full underside (bottom) surface of footings, caps, etc. Volume and surface area calculations shall be in units of feet. Therefore, the volume shall be measured in units of cubic feet and the area in units of square feet.

Mass concrete members will be as designated on the plans. Deck slab placements will not be considered as mass concrete.

**a. Thermal Curing Plan**. At least 20 days prior to the Mass Concrete pour; the Contractor shall submit to the Engineer a Thermal Curing Plan Report. The Report shall address the following issues:

(1) An analysis of the anticipated thermal developments within the mass pour placements using proposed materials and casting methods.

(2) A plan outlining specific measures to be taken to control the temperature differential within the limits stated below.

(3) The proposed monitoring system.

(4) Outline of corrective actions to maintain the temperature differential.

(5) Proposed methods of repairs or corrective actions if the mass concrete member is not accepted.

**b. Curing and Monitoring.** The Contractor shall thermally cure the concrete so as to maintain a temperature differential between the internal (hottest – located as close as possible to the center of the pour but not less than 12 inches from the surface and external (coolest) temperature of the concrete to a 35 degrees F. maximum. In addition, the internal temperature of the concrete (measured at the hottest point located at the center of the pour) shall at no time exceed 160 degrees F.

The Contractor shall provide temperature-monitoring devices to record temperature development between the interior and exterior of the element at points approved by the Engineer and shall monitor the mass pours to measure temperature differentials. Temperature monitoring shall continue until the interior temperature is within 35 degrees F. of the lowest ambient temperature or a maximum of two weeks. The Resident Engineer shall be provided with a copy of each set of readings as they are taken and a temperature chart for each mass pour element showing temperature readings vs. time.

If monitoring indicates that the proposed measures are not controlling the concrete temperature differential within the 35 degrees F. specified, the Contractor shall implement corrective actions as presented in the Thermal Curing Plan to maintain the temperature differential.

**c. Concrete Mix Requirement**. In order to better control the heat of hydration of the mass concrete, the concrete mix design shall contain a pozzolanic material; such as, fly ash, silica fume or ground granulated blast furnace slag.

**d. Approval and Acceptance.** Should any mass concrete placed under this specification prove unsatisfactory, the Contractor will be required to make the necessary repairs or remove and replace the material at the Contractor's expense.

The Engineer will be the sole judge in determining acceptance of the Mass Concrete member. Corrective actions, as approved in the Thermal Curing Plan Report, shall be made to those areas directed by the Engineer before the Mass Concrete member will be considered for acceptance.

**501.15 Deck Slab Surface Texture Finish.**
THE FIRST PARAGRAPH AND SUBPART 1 ARE CHANGED TO:

The surface of the deck slab shall be finished according to Subsection 405.13 except that Subpart G shall not apply. The time between strike-off and application of deck slab surface texture finish in any location shall not exceed one hour. All concrete bridge deck slabs shall be textured with a stiff, coarse broom and shall be saw cut groove finished as follows:

**1. Broom Finish.** Immediately after finishing has been completed, the surface shall be given a texture with an approved stiff, coarse broom.

The broom shall be operated in a longitudinal or transverse direction. Once begun, the direction of texturing shall not be changed. Transverse texturing shall be done from a work bridge.

The broom finish shall be applied so as to prevent ridges or gouges from forming in the concrete surface. The broom shall be weighted and the contact area changed as required to produce a uniform texture. The broom shall be cleaned periodically to remove all hardened concrete particles. Texture resulting from the broom shall stop within 1 foot of curbs.

**3. Saw Cut Grooved Surface.**
THE SECOND PARAGRAPH IS DELETED.

**501.16 Concrete Deck Surface Requirements.**
**B. Control Testing.**
THIS SUBPART IS CHANGED

Deck slab surfaces shall be checked during placement to correct surface irregularities while the concrete is in workable condition.

Such control testing shall be performed as follows:

1. After strike-off, the deck surface shall be checked with an aluminum straightedge having a minimum length of 10 feet, as provided by the contractor. The Resident Engineer shall determine the specific conduct of the control testing, including the number and location of Straightedge checks. Surface variations shall be corrected before the concrete sets. Major deviations shall be corrected by the finishing machine or other strike-off, while minor deviations may be corrected by a straightedge or float. The addition of water to the surface of the concrete to assist in finishing operations will not be permitted.

THE FIRST PARAGRAPH IN SUBPART C IS CHANGED TO:

**C. Acceptance Testing.** Conformance to the surface tolerance for concrete deck slabs will be determined in lots, each being equal to the length of deck in one span or continuous span. The longitudinal limits of the lot will be bounded by the expansion joints or fixed structural deck joints. The full length of the lot will be tested through any construction joints within the deck, whether these joints are required for the placement sequence or caused by the Contractor's operations. Such lot quantity will be calculated using the specified nominal deck thickness and excludes the quantity of concrete placed in haunches, end dams, and diaphragms. For the second course of the two-course deck slab construction, such lot quantity will be calculated using the specified nominal thickness of the concrete overlay protective system.

**501.17 Curing and Protecting Concrete**
**A. Curing Concrete Under Normal Conditions.**
THIS SUBPART IS CHANGED TO:

Concrete decks, curbs, and tops of sidewalks for one-course deck slab construction shall be cured according to Subheading 4 of Subsection 405.14 with the exception that the minimum wet cure period shall not be less than seven calendar days. The burlap shall be kept continuously wet throughout this curing period. According to the provisions of Subheading 3 of Subsection 405.14, the wet burlap shall be covered with white polyethylene sheeting for the seven-day duration. The polyethylene sheeting shall be lapped at the joints and secured to the deck as tightly as possible. In two-course deck slab construction, the Contractor shall prepare the entire deck surface area according to Subheading 6 of Subpart C of Subsection 518.06 before placing the second course. The second course shall be cured according to Subsection 518.06 C.12.

The time between final finishing and application of the wet burlap shall not exceed 20 minutes in any location within the placement area.

Other concrete structures and concrete surfaces to receive an epoxy coating, rubbed finish or to be covered with another material shall be cured according to Subheadings 2, 3, 4, and 5 of the sixth paragraph of Subsection 405.14.

**501.26 Basis of Payment.**
THE 18TH PAY ITEM IS CHANGED TO:

| *Pay Item* | *Pay Unit* |
|---|---|
| SAWCUT GROOVED DECK SURFACE | SQUARE FOOT |

THE FOLLOWING PAY ITEMS ARE ADDED:

| | |
|---|---|
| CONCRETE IN STRUCTURES, FOOTINGS, CLASS A, HPC | CUBIC YARD |
| CONCRETE IN SUPERSTRUCTURE, DECK SLABS HPC | CUBIC YARD |
| CONCRETE IN SUPERSTRUCTURE, SIDEWALKS HPC | CUBIC YARD |
| CONCRETE IN SUPERSTRUCTURE, PARAPET, ____ HIGH, HPC | LINEAR FOOT |
| CONCRETE IN SUPERSTRUCTURES, BRIDGE MONUMENT, HPC | CUBIC YARD |
| CONCRETE IN SUBSTRUCTURES, PIER COLUMNS AND CAPS, HPC | CUBIC YARD |

THE FOLLOWING IS ADDED:

No separate payment will be made for work described under 501.12, Subpart 20. Mass Concrete. Such cost shall be included in the bid price for the applicable Pay Item.

In the construction of deck joint systems, no separate payment will be made for supplying and installation of steel armoring that is to be placed on the roadway side of the header. Such cost shall be included in the bid price for the Pay Item "Concrete in Substructures, Abutment Walls".

Payment for the furnishing of the F–Shape and Texas Type HT barriers shall be made under the Item "Concrete in Superstructure, Parapets". Steel railing that is to be provided with the Texas Type HT barrier shall be included in the Item.

Separate payment will not be made for patching holes the drainage holes in the parapet. All costs for patching these holes shall be made under the various "Concrete in Superstructure, Parapet, ___High, HPC" items and shall include all costs for material, labor and equipment.

## SECTION 502 – PRESTRESSED CONCRETE STRUCTURES

**502.02 Materials**

THE FOLLOWING IS ADDED:

Epoxy coating for the strand shall conform to Subsection 524.02.

**502.08 Concrete.**

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

The handling, measuring, proportioning, mixing, and placing of concrete for the PCEF Bulb Tee pretensioned prestressed concrete beams shall conform to Subsection 914.02 for High Strength Precast/Prestressed concrete and shall be P-4 concrete as modified by the HPC requirements. Concrete shall be deposited only in the presence of the Engineer.

**502.16 Method of Measurement.**

Pretensioning strand in the cap beam will be paid separately and will not be measured and payment will be made for the quantity in the Proposal adjusted for Change Orders.

**502.17 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Unit* |
|---|---|
| PRETENSIONED PRESTRESSED CONCRETE BEAMS, XB 71 X 47 | LINEAR FOOT |
| PRETENSIONING STRAND IN CAP BEAM, EPOXY COATED | POUND |

THE FOLLOWING IS ADDED TO THE LAST PARAGRAPH:

Payment for the use of plain elastomeric bearing pads shall be included in the price that is bid for the prestressed concrete beam type that is to be used in the project. Payment for the use of other type bearing assemblies shall be according to the provisions of 503.18.

## SECTION 503 - STEEL STRUCTURES

**503.01 Description.**
THE FIRST PARAGRAPH IS CHANGED TO:

This work shall consist of the furnishing, fabrication, erection and painting of bridges, structures, furnishing of Structural Bearings and Reinforced Elastomeric Bearings and associated elements that include use of structural steel and miscellaneous metals.

**503.02 Materials**

**E. 1. Elastomer Material.**
THE LAST SENTENCE IN THE FIRST PARAGRAPH IS DELETED.

**E. 3. Bond Strength.**
THIS SUBPART IS CHANGE TO:

The vulcanized bond between fabric and reinforcement shall have a minimum peel strength of 30 lbs/inch. Steel laminated bearings shall develop a minimum peel strength of 40 lbs/inch. Peel strength tests shall be performed by ASTM D 429 Method B.

**503.03 Inspection and Testing.**

**503.07 Shipping, Handling and Erection.**
**B. Erection.**
THE FOLLOWING IS ADDED TO THE FIRST LISTED ITEM 2.:

The written plan shall be signed by a Professional Engineer licensed in the State of New Jersey. The Contractor's Professional Engineer and the State's Design Engineer shall attend the meeting.

THE FOLLOWING IS ADDED TO THE FIRST LIST:

4. The Contractor's Professional Engineer shall inspect each phase of girder installation prior to permitting vehicular or pedestrian traffic on or below the bridge.

**503.08 Setting Shoes and Bearings.**

**D. Structural Bearings.**

THE FIRST SENTENCE IS CHANGED TO:

This work shall consist of furnishing and installing structural bearing assemblies that are one or more of the following types: High Load Multi-Rotational (HLMR) bearings as defined in 503.02 or Seismic Isolation Bearings. As per the requirements of 105.04, Working Drawings, for the complete design of such structural bearing assemblies, shall be submitted. The designs shall conform to the provisions of the AASHTO LRFD Bridge Design Specifications and/or the AASHTO LRFD Bridge Construction Specifications and these Specifications.

**503.17 Method of Measurement.**

THE FOLLOWING IS ADDED:

Reinforced Elastomeric Bearing assemblies shall be measured on a Unit basis.

**503.18 Basis of Payment.**

THE FOLLOWING PAY ITEM IS DELETED:

| *Pay Item* | *Pay Unit* |
|---|---|
| STEEL BEARINGS FOR PRESTRESSED CONCRETE BEAMS | LUMP SUM |

THE FOLLOWING PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| REINFORCED ELASTOMERIC BEARING ASSEMBLY | UNIT |

THE SECOND PARAGRAPH IS CHANGED TO:

Structural bearing assemblies shall include payment for furnishing all labor, materials, tools, equipment and incidentals, and all work involving furnishing, testing, and installing said bearing assemblies, complete and in place, as shown on the Working Drawings.

## SECTION 504 - TIMBER STRUCTURES

**504.03 Construction Requirements.**

THE FOURTH PARAGRAPH IS DELETED.

## SECTION 505 - LOAD BEARING PILES

**505.02 Materials.**

THE FOLLOWING IS ADDED TO THE LIST OF MATERIALS:

Coal tar epoxy-polyamide paint .....912.04

**505.03 Equipment.**

**B. Impact Pile Drivers.**

SUBPART 3. IS CHANGED TO:

3. For steam or air hammers, the weight of the ram shall be no less than 1/3 the weight of the pile. For diesel hammers, the weight of the ram shall be no less than ¼ the weight of the pile.

**E. Leads and Followers.**

THE FOLLOWING IS ADDED AFTER THE SECOND SENTENCE:

Leads may be either of the fixed or swinging type. Fixed leads, when used, shall be held in position by guys or braces to ensure support to the pile during driving. Swinging leads, when used, shall be fitted with a pile gate at the bottom of the leads and, in the case of battered piles, a horizontal brace may be required. Swinging leads shall be adequately embedded in the ground or the pile constrained in a structural frame such as a template to maintain alignment.

**G. Hammer Cushion (Cap Block) and Pile Cushion.**

**1. Hammer Cushion.**

THE SECOND AND THIRD SENTENCES ARE CHANGE TO:

Hammer cushions (cap block) shall be made of manufactured materials according to the hammer manufacturers guidelines. Wood, rope, wire rope, hose, tires and asbestos cushions are specifically disallowed and shall not be used.

**505.04 Preparation for Driving.**

THE FOLLOWING IS ADDED:

**4. Installation Sequence.** The order of placing individual piles in pile groups shall be either starting from the center of the group and proceeding outwards in both directions or, starting at an outside row and proceeding progressively across the group.

**505.06 Methods of Driving.**

**1. Accuracy of Driving.**

THE FIRST SENTENCE IS CHANGED TO:

Foundation and fender piles shall be driven with a variation of not more than ¼ inch per foot from the vertical or from the batter. Foundation piles shall not be out of the required position by more than 6 inches after driving, or ¼ of their diameter, whichever is greater.

THE FIRST PARAGRAPH OF SUBPART 4. IS CHANGED TO:

**4. Test Piles.** Test piles of the specified materials, dimensions, and at the designated locations shall be furnished and driven with an impact hammer unless specifically stated otherwise in the Special Provisions or on the Plans. In general, lengths of test piles will be greater than the estimated length of production piles to provide for variation in soil conditions. The driving equipment and procedure (criteria) used for driving test piles shall be identical to that which the Contractor proposes to use on the production piles. The Contractor shall excavate the ground at each footing location to the elevation of the bottom of the footing before the pile is driven.

**505.07 Determination of Bearing Values.**

THE FIRST PARAGRAPH IS CHANGED TO:

Test piles of the materials and dimensions specified and lengths directed shall be furnished. Test piles shall be driven with the same type of equipment that is used for driving production piles. Test piles shall be driven at the designated locations to the bearing capacity and tip elevation that is shown on the Plans. The Engineer shall be the sole judge in determining bearing capacity and the length of pile to be driven.

SUBPART 2. IS CHANGED TO:

1. **Empirical Pile Formula.** If no other methods of determining pile capacity are stated in the Special Provisions or Plans, then the ENR formula shall be used.

4. **Dynamic Pile Load Tests.**

THE SECOND SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The ultimate capacity of the pile in addition to the soil set-up behavior will be determined with pile analyzer instruments.

THE THIRD SENTENCE OF THE FIFTH PARAGRAPH IS CHANGED TO:

The restrike should be terminated when the ultimate capacity of the pile is reached or the penetration reaches 6 inches or the total number of hammer blows reaches 50, whichever occurs first.

THE FOLLOWING IS ADDED TO THE FIFTH PARAGRAPH:

Restriking with PDA and CAPWAP shall be conducted when directed by the engineer after one week and a separate restriking may also be required two weeks after initial driving. Each of these restrikings will be considered separately and will be in addition to the dynamic pile load test. The criteria for these restrikings shall be the same as for the restriking that is part of the dynamic pile load test and shall include the analysis using the CAPWAP program.

**505.11 Manufacture of Precast Concrete Piles and Precast Concrete Pile Caps.**
THE THIRD PARAGRAPH IS CHANGED TO:

Concrete piles for use in seawater and sulfate soils shall be cured for not less than 30 days before being used.

**505.12 Extensions and Splices.**
**B. Precast and Prestressed Concrete Piles.**
THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGE TO:

After the driving is completed, the concrete at the end of the pile shall be cut away leaving the reinforcing steel exposed for a length of 40 diameters.

**505.13 Cut-Offs and Cappings.**
THE SECOND PARAGRAPH IS DELETED.

THE THIRD PARAGRAPH IS CHANGED TO:

As shown on the Plans, all piles shall be anchored to the structure.

**505.14 Painting Steel Piles and Pipe Shells.**

THE FOLLOWING IS ADDED:

The top 30-foot of steel pipe piles shall be coated with Coal tar epoxy-polyamide paint.

**505.15 Method of Measurement.**
THE 10TH PARAGRAPH IS CHANGED TO:

Splices for all type piles will be measured per each individual splice. However, splices within the pile length ordered by the Engineer will not be measured unless the ordered length is in excess of 80 feet.

THE NEXT TO LAST PARAGRAPH OF THIS SUBSECTION IS CHANGED TO :

Dynamic pile load tests will be measured by the unit when specified by contract documents. No separate payment will be made for dynamic pile load tests and CAPWAP analysis performed on piles which require restriking after waiting a minimum of 24 hours but less then one week. This restriking and the CAPWAP analysis of the dynamic load test will not be measured and will be included in the price bid for the Dynamic Pile Load Test (Dynamic) Item. When dynamic pile load tests (Dynamic or PDA Monitoring) are used, no payment for installation of test piles will be made until recorded data is submitted to the engineer. The recorded data shall include the data from restriking the piles after one and/or two weeks if this restriking is directed by the engineer.

THE FOLLOWING IS ADDED:

Restriking of piles after one and also two weeks will be separate from the dynamic pile load tests and will be measured by the number of units.

**505.16 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| Pay Item | Unit |
|---|---|
| CONCRETE FILLED STEEL PIPE PILES, FURNISHED, 24" DIAMETER | LINEAR FOOT |
| CONCRETE FILLED STEEL PIPE PILES, DRIVEN, 24" DIAMETER | LINEAR FOOT |
| SPLICES, FOR STEEL PIPE PILES, 24" DIAMETER | UNIT |
| RESTRIKING | UNIT |

THE FOLLOWING IS ADDED:

No additional payment will be made for redriving of piles that are forced up by any cause. Included in the Payment will be all costs for all material, labor, equipment, and other necessary items required for completing the work including storage costs, disposal of unused piles, repair to damaged piles, coating with coal tar epoxy-polyamide paint, and transportation costs. Parts of pile cut off will not be included for payment.

## SECTION 506 – BULKHEADS, FENDER SYSTEMS, AND DOLPHINS

THE TITLE OF THIS SECTION IS CHANGED TO:

## SECTION 506 – BULKHEADS, FENDER SYSTEMS, DOLPHINS AND ACCESS PLATFORM

**506.01 Description.**

THE FOLLOWING IS ADDED:

The Mansafe/Unistrut System consists of the construction of a Unistrut Mansafe Fall Arrest System on the fender system.

This work shall also consist of designing, furnishing and installation of Fiberglass Reinforced Plastic Piles (FRPP) that will be used for the construction of the fender system and the public access platform. All equipment, materials and labor that are required to install these type piles, as shown on the plans, shall be included.

This work shall also consist of designing, furnishing and installing Fiberglass Reinforced Plastic Lumber (FRPL) wales for fender systems and smaller dimensional FRPL for platform as shown on the plans for the fender system and public access platform as specified herein.

This work shall also consist of furnishing and installing two navigational clearance gauges each consisting of composite lumber piles and aluminum sign panel and gauge.

**506.02 Materials.**

The following is added to the list of material references:

Fiber Reinforced Plastic Lumber.....921
Fiberglass Reinforced Plastic Piles.....922

THE FOLLOWING IS ADDED:

The material conformance criteria of Section 921 shall be followed for supplying Fiber Reinforced Plastic Lumber and of Section 922 for supplying Fiberglass Reinforced Plastic Piles.

For the navigational clearance gauges, all bolts, nuts and washers used for the connection of panel and gauge to posts shall be stainless steel conforming to ASTM A 193/A 193M, austenitic steel, class 1A. The aluminum sign panel and gauge shall be flat sheet of alloy TOT2-H38 or 6061-T6 alloy, 0.1 inch (2.5 mm) thick. The faces shall be retroreflective sheeting, Type II. Signs shall be fabricated according to Subsection 916.08. The piles shall be fiberglass reinforced plastic piles.

The Mansafe/Unistrut System shall be the Unistrut Mansafe System and can be accessed at http://www.unistrutsafetysystems.com.

A. The Fall Protection System shall be designed to allow users to walk uninterrupted the entire length of the system without having to unhitch from the system to pass through intermediate support points. The system shall be designed to support users in case of a fall and to prevent the users from free falling more than 6 feet. The system shall be designed for hands-free operation once the user is properly attached to the system. All components shall be designed by the Fall Protection System supplier and shall meet the applicable requirements of ANSI A10.14.
B. Description
    1. Fall Protection System shall consist of a stainless steel safety cable attached to the structure. The cable shall be continuous or shall have swaged splices which allow the user to pass without unhooking from the system.
    2. The cable shall have a stainless steel entry terminal, with a plastic spring gate, swaged to the cable at each end.
    3. A stainless steel, spring-loaded line tension device and turnbuckle will be provided at one or both ends. Provide stainless steel end brackets to attach the cable to the structure.
    4. Support cable not to exceed 30-foot maximum intervals, with stainless steel ”D“ rings and hangers designed to allow the user to pass without unhitching from the cable.
    5. Provide stainless steel lanyard coupler devices (”transfastener“) with connector eye. The coupler device shall be able to be hooked and unhooked at the entry terminals and be able to pass intermediate cable supports and splices without having to be detached.
    6. Brackets and supports shall be attached to the structure with appropriate anchors of proper size and embedment, as per 2.02 C., to adequately support the intended load.
C. Lanyard: Provide, adjustable length, tear out shock absorbing, nylon lanyards with double-locking snap assemblies at each end meeting OSHA 1926.104 and ANSI A10.14 and as recommended by the Safety Restraint System supplier.
D. Support Harness: Provide nylon Class III full-body harnesses with back ”D“ ring.

Working drawings shall be submitted for the Mansafe System in accordance with Subsection 105.04 and shall include the following:

1. Product Data: Manufacturer‘s data and product information for manufactured materials and products.
2. Shop Drawings: For fabrication and erection. Include plans, member profiles, sizes, elevations, and details for anchorages and connections.

3. Maintenance Manual: Indicating parts list and maintenance requirements for all equipment.
4. Operations Manual: Indicating proper procedures and equipment for safe operation of the system.
5. Experience Information: Including type of Fall Protection System, location and date of installation, and owner‘s name and address.
6. Test Certificate: Indicating completion of proof load testing on installed system.

**506.04 Timber Structures**

THIS SUBSECTION HEADING IS CHANGED TO:

**506.04 Timber Structures and Mansafe/Unistrut System.**

THE FOLLOWING IS ADDED:

**Mansafe System**

1. Install in accordance with approved shop drawings and manufacturer‘s instructions.
2. Fall Protection System shall be installed by manufacturer‘s authorized trained and certified personnel.
3. Install anchorages and fasteners in accordance with manufacturer‘s recommendations to obtain the allowable working loads published in the product literature and in accordance with this specification.
   a. Do not load or stress Fall Protection System until all materials and fasteners are properly installed and ready for service.
   b. Anchorages drilled into concrete.
      i. Follow manufacturer‘s recommendations.
      ii. Do not cut or damage reinforcement.
      iii. Clean drill hole and remove debris and contaminants in accordance with manufacturer‘s instructions.
      iv. Install anchorages at indicated locations, clearances and embedment depth.
      v. When clearance and spacing of anchorage is not indicated on drawings, install at location recommended by manufacturer to obtain maximum working loads and in accordance with the following:
         1. Anchorage clearance to edge of concrete: Not less than 7 bolt diameters.
         2. Anchorage spacing center to center: Not less than 10 bolt diameters.
      vi. When embedment depth is not indicated on the drawings, install with embedment depth not less than 6 bolt diameters.
4. After the Fall Protection System is installed and properly tensioned, the safety system manufacturer‘s approved authorized representative shall inspect and operate the system and shall make all final adjustments for proper operation.
5. After the system has been placed into operation, the manufacturer‘s authorized representative shall perform proof testing and issue a certificate attesting to the systems ability to withstand the proof load.
6. When embedment depth is not indicated on drawings, install with embedment depth not less than 6 bolt diameters.
7. Provide a maximum of 4 hours of operator training after system has been installed and proof tested. Training is to take the form of a single class conducted at the installation site.
8. Remove all loose materials, crating and packing materials from premises.

THE NEW SUBSECTION IS ADDED:

**506.06 Fiberglass Reinforced Plastic Piles/ Fiberglass Reinforced Plastic Lumber.**

**A. Fiberglass Reinforced Plastic Lumber (FRPL)**. The following criteria shall be adhered to in furnishing FRPL for the project:

**1. Submission Requirements**. The Contractor shall submit the following information to the Resident for approval at least thirty (30) days before installation of FRPL.

a. Copies of the FRPL manufacturer's standards and most recent brochure for the product covered by these Specifications. The manufacture's recommendations regarding roughening the surfaces of the walking areas of the fender system and the access platform shall be addressed in the working drawings.
b. According to the requirements of Subsection 106.04, the Contractor shall submit a written certification from the FRPL manufacturer that their product satisfies the requirements of Section 921 and has been in service for a minimum of three (3) years on other bridge protection applications in the United States. This written certification shall include project owner information, project names, locations, contacts and phone numbers.
c. Copies of independent lab test reports and performance test data that confirm that the FRPL meets the Plastic material properties and the structural property requirements specified in Section 921.

**2. Shipping, Storage, Handling**. During storage FRPL materials shall be protected at all times against exposure to extreme heat or impact. FRPL shall be shipped in a manner that will minimize scratching or damage to the outer surfaces. FRPL shall be stacked on dunnage above ground so that it may be easily inspected and stored in a manner that will avoid damage. FRPL shall be handled with nylon slings. Sharp instruments shall not be used in handling the product. FRPL damaged in shipping or handling will be rejected.

**3. Installation**. FRPL shall be cut, beveled, drilled, countersunk, and otherwise fabricated in accordance with the manufacturer's recommendations. Set all material accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Securely attach all FRPL to substrate by anchoring and fastening as shown on plans.

**B. Fiberglass Reinforced Plastic Piles (FRPP)**. The following criteria shall be adhered to in furnishing FRPP piles:

**1. Working Drawings**. According to the requirements of Subsection 105.04, FRPP submissions shall consist of working drawings. The submission shall include calculations to establish the FRPP structural properties found in Tables 3-A and 3-B. The manufacturer's recommendations regarding roughening the surface to establish maximum skin friction in the soil to guard against heaving of the piles shall be addressed in the working drawings.

**2. Additional Submittals**. Submit the following documentation and details to the Engineer for approval at least thirty (30) days prior to driving the piles.
a. Copies of FRPP manufacturer's standards and most recent product brochure for the product covered by these specifications.
b. Written certification from the FRPP manufacturer that their product meets the requirements of Section 922 and that the product has been in service for a minimum of three (3) years on at least 5 bridge protection applications in the United States. The certification shall include project owner information, project names, locations, contacts and phone numbers.
c. Independent test lab report confirming that FRPP meets the Plastic Material Properties and structural properties specified in Section 922.
d. Manufacturer's field guide with recommendations on handling, storage, cutting, drilling and driving. Driving recommendations shall include recommended driving energies.

**3. Splices**. Splices shall not be permitted except where overhead restrictions in the driving area require splices to be used. Splicing details shall be submitted to the Engineer for approval.

**4. Pile Points**. Steel pile points shall be provided by the manufacturer and attached prior to shipment.

**5. Allowable Variation in Pile Alignment**. Install FRPP truly vertical or accurately battered as indicated on the Contract Plans. The top of any pile driven its full length into the ground shall not vary from the plan location by more than 2 inches.

**6. Defective FRPP**. The provisions of Subsection 505.08, in addition to the following, shall apply for determining FRPP defective characteristics:
a. Incorrect pile location or batter.
b. Pile damage from any cause prior to driving.
c. Pile broken by reason of internal defects (even if placed in the leads), or improper driving.

**7. Cutting Off Piles**. Cut off the tops of FRPP at the elevation indicated on the Contract Plans, or as established by the Engineer. Cut the piles to a true plane, in accordance with the detail shown on the Contract Plans. All cut off lengths become the property of the Contractor.

**8. Wrapping**. Wrapping for the FRPP that are to be placed in clusters shall be ½" diameter cable (5/8" OD covering) polypropylene impregnated wire rope.

To verify suppliers of Composite Piles/Fiber Reinforced Plastic Piles/Composite Lumber that may be used, the Contractor is advised to study the "Bureau of Material's Approved List" on the following NJDOT website:
http://www.state.nj.us/transportation/eng/technology/materials

**506.06 Method of Measurement.**
THE SUBSECTION NUMBER IS CHANGED:
**506.07 Method of Measurement.**

THE FOLLOWING IS ADDED:

Composite Piles shall be FRPP and will be measured in linear feet of pile that is placed in accordance with the plans.

Composite Lumber shall be FRPL and will be measured in cubic feet computed on the basis of actual volumes and the shortest commercially available lengths which may be used and that is placed in accordance with the Plans.

Mansafe/Unistrut System will not be measured, and payment will be made on a lump sum basis.

Navigational Clearance Gauge will not be measured and payment will be made for the two clearance gauges on a lump sum basis.

**506.07 Basis of Payment.**
THE SUBSECTION NUMBER IS CHANGED:
**506.08 Basis of Payment.**

THE FOLLOWING ITEMS ARE ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| COMPOSITE PILES, ____ INCH DIAMETER | LINEAR FOOT |
| COMPOSITE LUMBER | CUBIC FOOT |
| STEEL SHEET PILING, WEST BULKHEAD | SQUARE FOOT |
| STEEL SHEET PILING, EAST BULKHEAD | SQUARE FOOT |
| MANSAFE/UNISTRUT SYSTEM | LUMP SUM |
| NAVIGATIONAL CLEARANCE GAUGE | LUMP SUM |

Pile splices and Pile shoes for Composite piles will not be measured for payment and will be included with the cost of the pile.

Wrapping is to be paid for under the item "Composite Pile, ___ Inch Diameter".

No additional payment will be made for re-driving of Composite Piles that are forced up by any cause. Included in the Payment will be all costs for all material, labor, equipment, and other necessary items required for completing the work including storage costs, disposal of unused piles, repair to damaged piles, and transportation costs. Parts of pile cut off will not be included for payment.

Payment for Composite Lumber shall include all material, labor, equipment, fasteners, and other necessary items required for completing the work including storage costs, disposal of unused materials, and transportation costs.

No separate payment will be made for grout, plates, bolts, screws or other hardware for attaching the wales to the piles or for assembly/installation of the platform. The cost hereof is to be included in the pay item "Composite Lumber".

No separate payment will be made for the piles, signs, text and connections for the navigational clearance gauge and all costs shall be included in the lump sum price bid for the item "Navigational Clearance Gauge"

## SECTION 510 - PUBLIC UTILITIES IN STRUCTURES

**510.01 Description.**

THE FOLLOWING IS ADDED:

This work shall also consist of installing Comcast cable conduit furnished by Comcast Cablevision of Ocean County.

**510.02 Materials.**

THE FOLLOWING IS ADDED:

JCP&L will furnish all electrical conduits, hangers, sleeves, clamps, expansion joints and two (2) manholes. Contractor shall furnish all conduits, hangers, sleeves, clamps, and joints and for the telephone conduits.

Comcast Cablevision of Ocean County will furnish all Comcast conduits, hangers, sleeves, clamps, joints and associated appurtenances.

**510.05 Basis of Payment.**

THE FOLLOWING ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| COMCAST CABLE CONDUITS | LINEAR FOOT |

## SECTION 512 - TEMPORARY STRUCTURES

**512.03 Working Drawings.**

THE FOLLOWING IS ADDED:

If piles are proposed, the working drawings shall include the location of any test piles and analysis in accordance with Section 505. A WEAP analysis shall also be provided.

**512.05 Structures**

THE FIRST PARAGRAPH IS CHANGED TO:

The temporary structure, pedestrian bridge shall provide a vertical and horizontal waterway opening over the channel that is greater then or equal to the proposed bridge over the Manasquan River. It shall comply with all Coast Guard requirements and shall not obstruct any cameras, navigational lights, clearance gauges and other navigational aids.

The walkway surface shall be a “non-slip” surface (minimum coefficient of friction 0.8). If grating is used, grating shall be of a close-mesh, press-locked rectangular design that is ADA compliant (maximum spacing of main bars $^{11}/_{16}$”.

**512.06 Maintenance.**

The contactor shall remove all ice and snow from the temporary structure, pedestrian bridge.

**512.08 Basis of Payment.**

THE FOLLOWING IS ADDED:

Separate payment will not be made for maintaining and clearing the temporary structure, pedestrian bridge of snow and ice and for providing the non-slip surface and all costs shall be included in the price bid for the item "Temporary Structure, pedestrian bridge".

## SECTION 513 – SHEETING, TEMPORARY AND LEFT IN PLACE

**513.05 Method of Measurement.**
THE FIRST PARAGRAPH IS REMOVED AND THE FOLLOWING IS ADDED:

Temporary sheeting will be measured by the square foot basis. The area measured will be the product of the average height and the length of sheeting that is driven. The average height will be determined by extending a line from the bottom of excavation to a vertical plane of the top of sheeting.

## SECTION 520 - MECHANICALLY STABILIZED EARTH (MSE) WALLS

**520.01 Description.**
THE SECOND SENTENCE OF THE SEVENTH PARAGRAPH IS CHANGED TO:

To verify approved listing of MSE Wall systems that may be used, the Contractor is advised to study the "Bureau of Material's Approved List" on the following NJDOT website: http://www.state.nj.us/transportation/eng/technology/materials

**520.02 Materials.**

**6. Backfill Material.**

a. Select Granular Borrow Excavation Material.

THE FOURTH ITEM UNDER SIEVE SIZE IS CHANGED TO:

| **Sieve Size** | **Percent Passing** |
|---|---|
| No. 50 | 0-20 |

THE THIRD PARAGRAPH IS CHANGED TO:

Select granular backfill shall meet the following recommended electrochemical limit requirements:

THE FIRST ITEM IN FOURTH PARAGRAPH IS CHANGED TO:

| **Property** | **Standard** | **Test Procedure** |
|---|---|---|
| Resistivity, ohm-cm | Greater than 3,000 | ASTM G57 |

THE SIXTH PARAGRAPH IS CHANGED TO:

The frequency of sampling of select granular backfill necessary to ensure electrochemical limits shall be performed at least once for every 6000 cubic yards of material that is placed. A minimum of one sample per structure shall be taken. Whenever the appearance or behavior of the material changes and as directed, additional samples shall be taken.

THE SEVENTH PARAGRAPH IS CHANGED TO:

The materials shall be substantially free of shale or other soft, poor durability particles. The material shall have a sodium sulfate soundless loss of less than 15 percent after five cycles determined according to AASHTO T 104.

THE LAST PARAGRAPH IS CHANGED TO:

The Contractor shall determine, by means of proper sampling and laboratory tests that the Select Granular Material from proposed sources conform to the requirements of the Specifications. A copy of all test results performed by the Contractor shall be furnished to the Engineer prior to delivery of the material.

**520.03 Methods of Construction.**

**O. Compaction of Backfill Material.**

6.

THE SECOND SENTENCE IS CHANGED TO:

AASHTO T 310 (Direct Transmission Method) shall be used to determine the achieved density.

## SECTION 521 - ALTERNATE RETAINING WALL DESIGNS

**521.01 Description.**

THE FOLLOWING IS ADDED TO THE THIRD PARAGRAPH:

Also, as required, provision for furnishing cofferdam work shall be included.

## SECTION 522 - NOISE BARRIERS

**522.07 Foundations.**

THE EIGHTH PARAGRAPH IS CHANGED TO:

Permanent metal casings shall consist of zinc-coated steel.

THE FOLLOWING IS ADDED TO THIS DIVISION:

# SECTION 523 - PRECAST CONCRETE CONSTRUCTION

**523.01 General**

**A. Description.**

The work specified in this Section consists of the fabricating and constructing of the precast concrete caps and columns.

The work includes the manufacturing of structural precast concrete segments and the storage, transport and erection of those segments into the completed structure. Materials, test methods and frequencies and methods of manufacture or fabrication will be according to Section 502 of the 2001 New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction - US Customary English Units. The final structure shall conform to lines, grades and design dimensions shown on the plans and with the provisions of these Specifications. This work also includes reinforcing steel embedded in the segments along with cast-in-place closure joints.

The Contractor must provide key personnel on the project with past experience on precast segmental bridges. Each of these key personnel shall have worked in a similar capacity on the construction of at least one precast segmental bridge in the past 15 years. The key personnel are as follows:

- Project Manager or Assistant Project Manager
- Erection Superintendent or Assistant Erection Superintendent
- Casting Superintendent

The Contractor prior to precasting or erection of the segmental bridge piers shall submit resumes of these three key personnel. The Contractor shall not perform any of the work involved in precasting or erection of the segmental bridge piers, until the Department has approved, in writing, the three key personnel identified above. Additionally, the Contractor is required to maintain throughout the duration of the project, in their respective positions, the three approved key personnel. If there is a need to replace any of the three key personnel during the course of the project, the proposed replacement(s) must have equivalent experience as stated above and must first be approved, in writing by the Department.

Unless otherwise stated, all provisions of Sections 501, 502, and 914 shall apply in the furnishing of precast concrete.

Materials and methods of construction that are used in the furnishing of precast concrete and that are not specifically covered on the Plans and in these Specifications shall conform to the AASHTO LRFD Bridge Design Specifications or to the AASHTO Standard Specifications for Highway Bridges, whichever is applicable. In lieu of the applicable AASHTO Specifications, the current ACI Manual of Concrete Practice and the current PCI Precast Prestressed Bridge Design Manual shall be adhered to.

The fabricator of precast concrete structures shall be certified by the PCI or the NPCA to the category of applicable work. The certification will be maintained during production of items for the Project. A copy of the current field audit report shall be submitted to the Department's Bureau of Materials before the start of production.

The Contractor (or Precaster) will provide an office for the exclusive use of the Engineer's precast inspector. The office will be maintained and provided until all precast segments have been delivered and erected and all concrete compression cylinder testing has been completed. The office will conform to all requirements of Subsection 502.03 E. of the 2001 Standard Specification and in addition include the following items:

a. A total of two direct telephone lines.
b. A water cooler with a sufficient supply of fresh bottled water that will be replenished on a weekly basis.
c. A facsimile (fax) machine and all necessary supplies required for its maintenance and operation.

**B. Definition of Terms.** The following terms apply to segmental bridge construction:

1. SEGMENT: Refers to a modular section of the substructure consisting of a certain cross-section shape and length as detailed on the plans. This is limited to precast pier column segments.

2. MATCH CAST: Refers to a precast concrete fabrication process whereby a segment is cast against the preceding segment producing a matching interface that will permit the reestablishment of the cast geometry at the time of erection. Match casting may be accomplished by either the short line or long line casting method.
3. SHORT LINE CASTING: A method of casting segments one at a time in a casting cell between a bulkhead at one end and a previously cast segment at the other. The first segment is cast between the bulkhead and another temporary bulkhead.
4. LONG LINE CASTING: A method of casting segments on a casting bed of sufficient length to permit the cumulative casting of segments for the entire length of a column between field closure pours without repositioning the segments on the casting bed. With this method, the first segment is cast between bulkheads and successive segments are cast between a movable bulkhead on one end and the previously cast segment on the other.
5. CASTING CELL: Refers to a special formwork arrangement usually consisting of an exterior and interior side forms and a soffit form of the cross-section shape.
6. PRECASTER: the firm or organization responsible for manufacturing the precast concrete segments (this may be the Contractor or his Sub-Contractor).
7. ERECTOR: the firm or organization responsible for the erection of the precast concrete segments in the final structure (this may be the Contractor or his Sub-Contractor).
8. SUPPLIER: the firm or organization responsible for supplying certain proprietary hardware or equipment for incorporation in the structure.

**C. Contractor Proposed Options.** The Contractor may propose alterations to the precast column segment heights represented in the contract drawings.

**D. Shop Drawing Requirements.** Shop drawing submission shall conform to the requirements of Subsection 105.04. The Contract Documents provided to the Contractor are construction documents.

For the items that are Contractor options and not included as construction drawings, the Contractor shall submit detailed shop drawings.

All other bridge items shall require shop drawings.

**1. Precast Segment Fabrication System.** Complete details of the proposed precast segment fabrication system, including casting forms, their foundations, operational details, casting yard layout and precast geometry control observation and measuring system. The casting form details may be provided by presenting a generalized drawing with a table of specific dimensions for the various segment forms.

**2. Post-Tensioning System.** Complete details for the Contractor's proposed post-tensioning system, including ducts, grout injection and outlet vents, anchorage hardware, any additional anchorage reinforcing, inserts and lifting devices to be embedded in the segments. For any Contractor proposed options, a complete geometric layout for each post-tensioning tendon shall also be submitted.

**3. Precast Substructure Segment Geometry Control.** The Contractor shall provide the casting geometry control procedures that he intends to use for precast substructure segments to the Engineer for review and approval.

**4. Handling, Storage and Transport of Segments.** The Contractor shall provide complete details of handling, storing and transporting of segments. These details shall include, for each type of segment, the method of lifting (location of any inserts, configuration of lifting devices, etc.) and the method of supporting segments during storage and transportation, the planned route for transporting the segments and the axle loads for the segment hauler.

The Contractor shall provide verification that the handling, storage, and transporting methods do not exceed the maximum forces that are assumed in the Contractor design of the segments for lifting, storage, and transportation.

The support system used by the Contractor shall be submitted to the Engineer for approval.

**6. Erection Manual.** A manual for the detailed step by step erection of the segments including all intermediate procedures relating to any erection equipment, falsework, movement of equipment, counterweights, support jacking, stressing of temporary post-tensioning bars, closure operations including any partial stressing across the closure during concrete curing, location and size of shim blocks, main post-tensioning tendon

sequences, stressing loads and elongations, erection elevations, the field survey and alignment control methods to be employed for setting the initial and subsequent segments and any other relevant operations shall be provided by the Contractor. (This is referred to as the "Erection Manual")

The Contractor shall submit a new erection procedure at any time that he proposes to deviate from the sequence of schedule of erection contained in an approved erection procedure under which he is operating.

For substructure segments, the Contractor shall provide an erection survey procedure for review and approval by the Engineer.

7. **Field Survey and Erection Control.** Field survey and alignment control methods to be employed for setting the initial and subsequent segments are the responsibility of the Contractor.

8. **Construction Equipment and Load Testing.** Complete details covering equipment to be used to handle segments and incorporate them into the structure, details related to access of post-tensioning stressing equipment, erection methods to be used, the sequence of erection, all loads to be imposed on any portion of the permanent structure by the erection equipment and details covering the time, location and all procedures for load testing of erection equipment.

9. **Calculations.** Calculations (prepared under the direction of, and signed and sealed by, a Professional Engineer registered in the state of New Jersey) to show that the loads imposed on the permanent structure by the erection equipment will not adversely affect the structural adequacy of the permanent structure, nor exceed allowed stresses during the construction process. The precast substructure elements shall be checked in accordance with the AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges, 1999. The footings and piles shall be checked in accordance with the AASHTO Standard Specifications for Highway Bridges, 2002 with current interims. This will only be required if the Contractor proposes to apply construction loads to the structure that are different than the loads or equipment shown on the Plans.

**E. Contractor's Quality Control.** The Contractor (and Precaster) are responsible for all quality control for the production of precast segments for any part of the structure (superstructure and, where required, substructure). Furthermore, the Contractor (and Erector) are responsible for all quality control for installation and erection of the segments and for the construction of all cast-in-place joints and closures.

The Contractor shall submit his detailed Quality Control Plan (QC Plan) for segment casting for the review and approval of the Engineer at least 30 days prior to the commencement of any segment production. The Contractor's Quality Control Plan shall not be approved if it does not follow the test methods, procedures and frequencies as required in the 2001 New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction. Likewise, the Contractor shall submit his QC Plan for erection to the Engineer for review and approval at least 30 days prior to the start of segment erection operations. Each plan shall clearly define the QC procedures, QC personnel, frequency of QC activities, remedial actions if required and other items that are needed in a detailed QC Plan. The Contractor (and Precaster) shall provide the Engineer's precast inspector with copies, on a daily basis, of all quality control reports, documents and material certifications related to the fabrication of all precast concrete segmental units. This information shall include but is not limited to, pre and post pour casting reports, concrete batching and delivery tickets and any other information requested by the Engineer. The Contractor (and Precaster) shall also provide the Engineer and precast inspector with copies of all reports related to the production of concrete supplied for the fabrication of precast concrete segmental units. This information shall include, but is not limited to, cement certifications, coarse and fine aggregate delivery tickets, admixture delivery tickets and certifications, equipment calibration and certification reports and any other Quality Control testing activities as required by the approved Quality Control Plan. All Quality Control activities related to the production of the precast concrete segmental units shall be performed at a frequency greater than or equal to that specified in the Standard Specification or the Special Provisions. The Contractor and/or Fabricator shall be responsible for the sampling and testing of fresh concrete to be used for the precast concrete segmental units. Further, the Contractor and/or Fabricator shall be responsible for the molding, curing and testing of concrete compression test cylinders. All

activities, equipment and facilities related to the molding, curing and testing of concrete compression test cylinders shall be provided and maintained by the Contractor and/or Fabricator at no additional cost to the Engineer. All molding, curing and testing of concrete compression test cylinders shall take place at the precast fabrication yard or plant, convenient to the fabrication activities.

Partial payments for mobilization of segmental production and casting, under the Special Provision for Precast Segmental Casting Forms and Erection Equipment, shall not be made without the approval by the Engineer of the Contractor's Quality Control Plans for the segment production and erection, respectively.

## MATERIALS

**523.02 Materials**

All materials shall be new and shall conform to the requirements contained herein.

**A. Concrete.** All concrete will conform to Section 501 and 914. Gradation for coarse aggregate utilized in the concrete for segments shall be No. 8 broken stone. Fine aggregate for segments shall be natural sands.

The class of concrete for use in each element of construction shall be as shown in the plans. Concrete used to cast closure joints between superstructure segments shall be the same mix as that used to cast the segments.

THE FOLLOWING ARE THE REQUIREMENTS FOR USING HIGH PERFORMANCE CONCRETE IN THE PRECAST SUPERSTRUCTURE AND SUBSTRUCTURE ELEMENTS:

**1. Description.** This work shall consist of the construction of portland cement concrete with the use of High Performance Concrete (HPC) for the precast superstructure and substructure. HPC is defined as concrete that meets special performance and uniformity requirements that cannot always be obtained by using conventional ingredients, normal mixing procedures and typical curing practices.

**2. Materials.**

Materials, admixtures and methods of construction not specifically covered in the plans and these Specifications shall conform to the AASHTO LRFD Bridge Design Specification or the AASHTO Standard Specifications for Highway Bridges, whichever is applicable and as stated herein.

In order to achieve the desired resistance to chloride penetration, an appropriate pozzalonic material; such as, silica fume, flyash or ground granulated blast furnace slag shall be provided in the mix design.

Pozzalonic material maximum percentage limitations that are stated in Subsection 914.02 and 919.18 may be waived for the development of HPC mix designs.

**3. Mix Design and Fabrication of the HPC.**

For the construction of the HPC items of work, the HPC shall be mixed, fabricated and furnished in accordance with the requirements of Section 914.02 for High Strength Precast/Prestressed concrete.

**B. Reinforcing Steel.** All reinforcing steel shall conform to the Project Specifications Section 501 and shall be ASTM A 615, Grade 60 [ASTM A 615M-96a, Grade 420] Reinforcement and shall be corrosion-protected where shown on the Plans. When permitted by the Engineer, welded reinforcing grillages shall be shop prepared and shall conform to the requirements of the American Welding Society's Structural Welding Code D1.4. Field welding of reinforcing steel shall not be permitted.

**C. Dry Packed Mortar.** Dry packed mortar for uses shown on the plans shall consist of Portland Cement conforming to the requirements of AASHTO M-85 (Type I or Type II) and silica sand to AASHTO M-45. Clean, potable water shall be free of substances known as harmful to Portland cement. Admixtures shall be as necessary to impart the required properties to the mortar. Admixtures containing chlorides, sulfites, fluorides, nitrates or aluminum powder shall not be used.

The Contractor shall determine, subject to approval of the Engineer, the exact materials and proportions to be used. The mortar shall be of a non-sag consistency containing only enough water to make it slightly adhesive. The mortar shall have the following physical properties.

| *Property* | *Test Value* | *Test Method* |
|---|---|---|
| Water Content | Minimal | -- |
| Shrinkage | 0% | ASTM C-827 |
| Compressive Strength at 28 days (Average of three Cubes) | 5,000 PSI* | ASTM C-109** |

* For superstructure applications, the strength shall be as stated in the plans for superstructure concrete.

** The test specimen shall be prepared using the materials and in the proportions which are to be used in production of the mortar.

Prior to beginning any dry packing of mortar on the project, the Contractor shall furnish to the Engineer the results of tests performed by a laboratory approved by the engineer demonstrating that the mortar mixture he proposes to use meets the requirements of these Specifications.

A commercially available, cement-based grout mixture that meets the requirements of this Specification may be used, subject to approval by the Engineer.

The ingredients shall be thoroughly blended in a manner that results in a uniform mixture.

**D. Ducts for Post-Tensioning Tendons.** Ducts to be embedded in or external to superstructure and substructure segments shall conform to the requirements of the Special Provision for Prestressing System.

**E. High Performance Grout for Bearing Plinths.** High Performance Grout for Bearing Plinths as shown in the Plans shall be High Performance Grout that is ready-to-use, non-shrink, non-corrosive, non-metallic and achieves a High Early Strength (5000 psi in one day). High Performance shall be Dayton Superior Sure-Grip High Performance Grout or an equal approved by the Engineer that meets the requirements of ASTM C-1107 Specification for Non-Shrink Grout Grades A, B, & C and requirements of ASTM C-827.

## EQUIPMENT

**523.03 Equipment**

Design calculations prepared under the direction of, and signed and sealed by, a Professional Engineer registered in the state of New Jersey shall be submitted for any erection equipment, falsework, and other temporary construction, which may be required to accomplish the work. These calculations shall only be checked to ensure that they have been properly signed and sealed by a Professional Engineer registered in the state of New Jersey. The Engineer will not review the calculations for any erection equipment, falsework, and other temporary construction, which may be required to accomplish the work. Prior to the use of special erection equipment, the equipment shall be personally inspected by the Contractor's Engineer who shall certify to the Engineer in writing that it has been fabricated in accordance with the submitted drawings and calculations. In addition, after assembly, the Contractor's Engineer shall observe the equipment in use and shall certify to the Engineer in writing that it is being utilized as intended and in accordance with the submitted drawings and calculations. In each case, the Contractor's Engineer shall also sign and seal the letter of certification.

After the erection or installation of falsework and shoring, that requires the submittal of design calculations or shop drawings, but prior to the application of any superimposed load, the falsework shall be personally inspected by the Contractor's Engineer who shall certify to the Engineer in writing that the falsework has been constructed in accordance with the materials and details shown on the submitted drawings and calculations.

For construction that affects public safety and prior to placement of any concrete, the Contractor's Engineer shall certify to the Engineer in writing that formwork has been constructed to safely withstand the superimposed loads to which it will be subjected during construction.

Prior to use of any equipment that is fabricated for the specific purpose of erecting any portion of the work included in this Project, the Contractor shall demonstrate by a full-scale load test that this equipment is adequate for its intended use on this project.

Observation of load testing of erection equipment, review of drawings and calculations covering erection equipment by the Engineer shall not be construed as any assumption by the Engineer of responsibility for means, methods, techniques, sequences or procedures of construction, nor on safety precautions or to a safety program thereto.

## REQUIREMENTS FOR PRECAST CONCRETE SEGMENTS

**523.04 Requirements for Precast Concrete Segments.**

All materials, details, and procedures shall be as specified herein or noted on the plans. Casting of segments shall not begin until review of required computations; post-tensioning system and concrete mix design, including a hot weather mix design, has been completed and approved by the Engineer. The segments shall be match-cast.

**A. Design of Forms.** The design and engineering of the forms and falsework, as well as their construction, shall be the responsibility of the Precaster. Forms shall be inspected and approved by the Engineer prior to authorizing casting operations. Forms that are worn, damaged or otherwise unacceptable to the Engineer shall be repaired to the Engineer's satisfaction before the casting of any segment will be authorized. Any segment cast in forms unacceptable to the Engineer may be subject to rejection. Forms that will not produce segments complying with the specified casting tolerances shall not be used until corrections are made.

Forms shall be mortar-tight and sufficiently rigid to prevent distortion due to the pressure of the concrete and other loads incidental to the concrete operations, including vibration. Forms shall be capable of casting the segments as shown in the plans.

All exposed surfaces of each element of the structure shall be formed with materials that will produce a similar surface texture, color and appearance for all concrete surfaces. The form surfaces of casting machines for superstructure shall be made of steel. The metal used for forms shall be of such thickness that the forms will remain true to shape. All bolt and rivet heads shall be countersunk. Clamps, pins or other connecting devices shall be designed to hold the forms rigidly together and to allow form removal without injury to the concrete.

The inside surfaces of forms shall be cleaned of all dirt, mortar and foreign material. Forms shall be properly coated with form oil prior to each use. The form oil shall be commercial quality form oil or other equivalent coating that will permit the ready release of the forms and will not discolor the concrete. Form oil shall be applied such that the finished surface of each segment is uniform in color as compared to the previously and subsequently cast segments. Form oil shall be applied such that none is deposited on the reinforcement in the forms.

Where sections of forms are to be joined, a maximum offset of 1/8 inch for flat surfaces and 1/4 inch for corners and bends will be permitted. The Precaster shall accurately survey forms on a monthly basis for the purpose of monitoring settlements and distortion in shape. If any settlements or distortions are of great enough magnitude to interfere with achieving the required segment tolerances, casting with these forms shall be discontinued until the problem is corrected.

**B. Preparation for Casting.** Care shall be exercised in setting up forms for casting segments. All materials to be encased within the concrete of the segment shall be properly positioned and supported. Provisions for all projections, recesses, notches, openings, block-outs and the like shall be made in accordance with the plans or approved shop drawings. Extreme care shall be taken in positioning the match-cast segment in relation to the segment to be poured. The match-cast segment shall not be twisted. The abutting surface of the bulkhead segment shall be covered with a thin film of a bond breaker consisting of flax soap and talc, or other material approved by the Engineer. The soap and talc mixture will be approximately five parts flax soap and one part talc. The mixture may be varied based on job experience and results. The acceptability of a material other than soap and talc shall be determined by demonstration on a large specimen that has a facial area of at least four square feet, prior to its use in casting of the segments.

It is the intent of this specification that the precast segments and the cast-in-place closures have a uniform appearance of concrete without stains and blemishes. After casting the first five (5) precast members, the Contractor and the Engineer will jointly inspect the appearance of the members. If they are not uniform in appearance then the Contractor will propose methods to repair these members and to produce subsequent members that are uniform in appearance. Only members that have a uniform appearance will be accepted for incorporation into the structure. The uniformity of appearance will be at the judgment and discretion of the Engineer. This joint inspection of precast bridge members is to be conducted thereafter on a mutually agreed upon schedule but at least twice a month during the casting operations.

The Contractor is alerted to the fact that the project requires the production of bridge superstructure and substructure members of uniform appearance and color. The Contractor should include the work and materials to produce bridge members of uniform appearance in his bid. This

requirement also applies to cast-in-place closures between precast members. These closures will be required to be made from the same materials used to produce the precast members. This might require extra effort on the Contractor's part to utilize the same materials in the concrete, forming and curing to produce cast-in-place joints that are uniform in appearance to the precast bridge members. The Engineer reserves the right to reject concrete members or closures that are not uniform in appearance or to accept them at 75% of their bid price. A meeting shall be held at least two weeks prior to the start of the casting operations where the Contractor presents his plan for producing members of uniform appearance. At this meeting the Contractor will present his plan including materials to be used; Quality Control checks; Corrective Action Plans and other pertinent information to demonstrate that a plan is in place to provide bridge members of uniform appearance. Previous Contractors have produced bridge members of uniform appearance by paying close attention to the form cleanliness; using clear form oils; using clear curing compounds; paying special attention to the application of the curing compounds; using patching materials that closely matched the original concrete; and other methods.

It is the intent of this specification to obtain concrete for all visible portions of the structure which is of the lightest practical gray color and which has the absolute minimum variation in color. The target uniform color to be produced is Federal Color Number 36622. The range of acceptable in-place concrete color shall be a visually consistent gray scale bounded between the Federal Color Numbers 35630 (lightest) and 36622 (darkest).

The contractor shall produce and submit sample concrete sections 18" x 18" x 2" of each concrete strength mix design which illustrate compliance with the acceptable color range. A minimum of 5 concrete strength shall be produced on different days in order to prove consistency of color obtained. Each submitted sample shall have permanently written on the back the sample number, the mix design number, form surface, form release agent, casting date and design strength.

Preparation of each sample shall follow in all respects the mixing and placing procedures, form surface material, curing methods and mix constituents proposed for each of the precast and cast-in-place (closure) concrete elements.

The samples that represent the final approved samples shall be kept by the Engineer for purposes of future comparison with production concrete. The Contractor shall be responsible for the transportation and handling of the samples as directed by the Engineer. The cost of these samples shall be included in the cost of the precast concete elements.

**C. Geometry Control.**

**1. Casting Manual.** For precast substructure segments, the Contractor shall submit his casting and erection geometry control procedures (30 days in advance of casting) to the Engineer for review and approval.

**2. Personnel.** The Precaster shall provide personnel experienced in casting control to carry out the daily tasks of geometry control.

Geometry control at the casting yard and at the bridge site shall be under the direct responsible charge of a Casting Superintendent who is a Professional Land Surveyor or Professional Engineer registered in the state of New Jersey. Personnel who directly supervise layout and geometry control measurements shall have experience in geometry control techniques for precast concrete segmental bridges and must have worked on one precast concrete segmental project in the casting yard in the last 15 years.

**3. Segment Hardware and Measurements.** Immediately after casting of a segment is complete, the length of the segment along the line of each web shall be measured and recorded and references for horizontal and vertical control shall be established as follows:

a. Horizontal Control - A wire stirrup on the horizontal control line at both ends of the segment. A line not more than 0.001 feet in width shall be scribed in a permanent manner into each stirrup. Wire stirrups shall be stainless steel.

b. Vertical Control – A flat head bolt, with a small, countersunk depression in the head shall be set approximately flush with the surface of the concrete over each web at both ends of the segment. The bolts shall be stainless steel or other rigid material approved by the Engineer.

After a segment is cast, and before bond breaking, the positions of the two adjoining segments shall be checked from established control points. If the positions are not as

required, corrections to the geometry shall be made in the next segment cast by utilizing the established control points.

**5. Requirements for Short Line Casting of Superstructure Segments.**

a. Instruments used to measure elevations shall be precision levels equipped with parallel plate micrometers capable of obtaining first order control and one-piece, invar rods with center point bases.

b. Instruments used to make horizontal measurements shall be a centerline sighting theodolite and centerline offset measuring tool directly graduated in intervals of 0.002 feet.

c. Elevation and centerline-offset measurements shall be observed to an accuracy of ±0.001 feet.

d. The set-up position of two adjacent segments before casting shall be independently determined by two observers. Casting shall not begin until these surveys agree within the following tolerances:

Elevation: ±0.002 feet on any control point.
Horizontal: ±0.002 feet on a segment centerline offset.

e. After cast observations shall be independently determined by two observers. They shall be checked until the independent observations agree within the following tolerances:

Elevation: ±0.001 feet on any control point.
Horizontal: ±0.001 feet on a segment centerline offset.
Twist error on elevation control points: ±0.001 feet
(with ±0.002 feet maximum on a random error)

**D. Embedded Items.** Reinforcing steel shall be fabricated and placed in accordance with the plans and as required herein. No reinforcing steel shall be cut or removed to permit proper alignment of tendon ducts or other embedded items. Any bar that cannot be fabricated to clear a post-tensioning tendon shall be replaced by additional bars, with adequate lap lengths, according to methods approved by the Engineer.

In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/2 inch, or 1/12 of the spacing between bars, whichever is less. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/4 inch. The top and bottom clear cover of reinforcing steel shall be within 1/4 inch of the clear cover limits dimensioned on the plans. The end and edge clear cover of the reinforcing steel shall be within one inch of the clear cover limits dimensioned on the plans.

In the event of a conflict between post-tensioning ducts and reinforcing bars, the post-tensioning shall generally have priority and the position of the bars shall be adjusted in a manner approved by the Engineer. Any such conflicts shall be brought to the attention of the Engineer for resolution and approval.

Embedded ducts for tendons shall be positioned accurately (within 1/4 inch) in respect to their vertical, linear and transverse position within each segment. Positive methods shall be utilized to assure that ducts will not be displaced during casting. Ducts that act to change the alignment of tendons shall be marked so that proper positioning is assured prior to casting and can be verified after casting.

Ducts internal to the concrete section shall be properly aligned when passing from segment to segment and from the segment to a cast-in-place closure.

Adequate spacing shall be provided for the duct supports. After installation in the forms, the end of the ducts shall be sealed to prevent entry of water and debris. Following each pour of concrete, the Precaster shall ensure that all empty ducts are unobstructed and undamaged.

Lifting devices incorporated in segments shall be adequate to distribute the handling and erection stresses without damage to the segment.

**E. Placing Concrete.** Concrete shall not be deposited into forms until the entire set up of the forms, reinforcements, ducts, and anchorage has been thoroughly inspected and checked. The placing of concrete shall not proceed until the rate of producing and placing concrete is sufficient to complete the proposed pour and finishing operations within the scheduled time. Furthermore, experienced concrete finishers shall be available where required for finish work and all necessary finishing tools and equipment are on hand at the site of the work and are in satisfactory condition for use.

During conveying, placement, and initial set, the concrete shall be protected against undue drying or rise in temperature and inclement weather. The placing of concrete shall not proceed until adequate measures, and protection, are available to prevent weather damage during conveying and placement. This includes shelter from rain intrusion during conveying, placement and curing.

Special care shall be taken to plan the sequence of placing concrete so as to assure that voids do not occur within the concrete in areas where air is likely to be entrapped within the forms or in areas where flow of the plastic concrete is constrained by embedded items.

Concrete shall not be dropped more than four feet, unless confined by closed chutes or pipes. Formwork shall not be considered as chutes. Care shall be taken to prevent segregation when discharging concrete into the forms. Care shall be taken to fill each part of the form by depositing the concrete as near to the final position as possible. After the discharge of individual concrete loads into the forms, concrete shall not be bodily moved from place to place within the forms by mechanical vibrators or other similar equipment.

Concrete shall be placed in horizontal layers not more than 18 inches thick except as hereinafter provided. Each layer shall be placed and consolidated before the preceding layer has taken initial set. Each layer shall be so consolidated as to avoid the formation of a construction (cold) joint with a preceding layer before it has taken an initial set.

Immediately after all the concrete has been placed and consolidated, all accumulations of mortar splashed upon the remaining exposed reinforcement and surfaces of forms shall be removed before the concrete takes its initial set. Care shall be taken when cleaning reinforcing steel to prevent damage to or breakage of the concrete-steel bond.

Placing equipment shall be of a size and design to permit placing of concrete within a workable time period to avoid cold joints or blemishes between successive lifts. Placing equipment shall be cleaned as necessary at the end of each operation or workday and, just prior to reuse, shall again be checked and cleaned of hardened concrete and foreign materials.

Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An approved device shall be used at the discharge end of a belt conveyor to prevent aggregate segregation. Mortar shall not be allowed to adhere to the return length of the belt. Concrete shall be discharged into a hopper or through a baffle.

No construction joints will be permitted within a segment except as detailed on the plans.

**F. Casting Tolerances.** The following tolerances apply to the fabrication of Substructure segments:

| | |
|---|---|
| Height (individual element) | +0.25 inches |
| Width and Breadth | +0.25 inches |
| Wall Thickness | +0.25 inches |

The following tolerances apply to the fabrication of all Precast Segments:

| | |
|---|---|
| Ends (deviation from a plane per 20 feet width or depth) | $\pm$ 0.25 inches per 20 feet not to exceed 0.5 inches |
| Flat Surface (deviation from a plane at any location) | $\pm$ 0.025 inches per foot not to exceed a total of 0.25 inches |

Dimensions from segment to segment shall be adjusted so as to compensate for any deviations within a single segment so that the overall dimensions of each completed element will conform to the dimensions shown on the plans. If a check of two segments of any column (selected at random by the Engineer) shows that these tolerances are exceeded, the Precaster shall implement appropriate corrective action to the satisfaction of the Engineer.

**G. Consolidation by Vibration.** All concrete shall be consolidated by means of approved vibrators together with any other equipment necessary to perform the work as specified. Vibration of concrete shall conform to Project Specifications with the following exceptions.

Internal vibrators shall have a minimum frequency of 8,000 vibrations per minute and sufficient amplitude to consolidate the concrete effectively. At least two standby vibrators in working condition shall be provided for emergency use in case of malfunction. The use of external vibrators for consolidating concrete will be permitted and may be required when the concrete is inaccessible for adequate consolidation. When external vibration is used, the forms shall be constructed sufficiently rigid to resist displacement or damage. Care shall be exercised

when placing and consolidating concrete so that reinforcing, post-tensioning ducts, anchorages and any other embedded items are maintained in their proper positions and are not damaged.

**H. Removal of Forms and Separation of Segments.** Weight supporting forms shall remain in-place until the concrete has reached the compressive strength specified for form removal. For precast segments, constructed as shown in the plans without design modifications, this strength shall be at least 3,500 psi unless otherwise designated in the plans.

Care shall be exercised in removing the forms, separating the new and match-cast segments and separating the new segment from the bulkhead in order to prevent spalling and chipping of the concrete.

Prior to moving a segment from its as-cast position, erection marks identifying its location in the structure and order in the erection sequence shall be affixed to the inside of the segment.

**I. Test Samples.** Test samples and testing for compressive strength of concrete on each precast segment and field closure joint, shall be made by the Precaster to ensure adequate strength of these components at various stages of their manufacture and assembly. Test cylinders shall be made from concrete representative of that used to cast the structural component, in accordance with the applicable portion of Section 914. A "test" consists of the average of two test cylinders.

Test Cylinders shall be cured in the same manner as the structural components. Test cylinders shall be made for the following conditions:

1. Prior to form release and/or moving the components to storage.
2. Prior to placing a component into position in the structure and/or stressing of post-tensioning tendons if the component is less the 28 days old.
4. The official 28day (56 day for HPC) strength test, performed by the Precaster at the fabrication site, shall be sent to the New Jersey Department of Transportation State Laboratory.

The test specimens for precast segments shall be stored in or on the segment or on a rack, in a condition representative of the curing conditions to which the segment is exposed. The Precaster shall provide sufficient specimens to allow for additional tests as necessary and shall maintain complete records of all testing.

**J. Curing Precast Concrete Segments.** It is the responsibility of the Precaster to determine the measures to be taken to protect and properly cure the concrete. The Engineer shall review for adequacy, the curing method proposed by the Precaster. If the method proposed by the Precaster fails to produce satisfactory results in the judgement of the Engineer, the Precaster shall use other methods or shall alter the method used, so as to provide acceptable segments.

The minimum curing period shall be five days or until the concrete has achieved the required 28-day (56-day for HPC concrete) compressive strength as determined by the above test cylinders cured under the same conditions as the segment. When the ambient temperature is below 35°F, concrete surface temperatures shall be maintained above 50°F during the initial curing period. The initial curing period is defined as the period of time until the concrete has achieved the required compressive strength specified for removing or lowering forms, or segment handling as determined by test cylinders cured under the same conditions as the precast segment.

Immediately after placing the fresh concrete it shall be cured through the initial curing period by one of the following methods. However, membrane curing-compound will not be considered an acceptable alternative for the initial curing period.

**1. Forms-in-Place Method.** For formed surfaces, leave the forms in place without loosening. Cover the wet concrete surface with a waterproof sheet material that prevents moisture loss from the concrete. Secure all moisture barriers so that wind will not displace them. Immediately repair broken or damaged waterproof sheeting.

**2. Water Method.** All surfaces shall be protected from the sun and the whole structure shall be kept wet for the initial curing period. The concrete surface shall be kept moist at all times by fogging with an atomizing nozzle until the covering is placed.

**3. Blanket Method.** Electrically heated curing blankets or insulation blankets may be used in cold weather to maintain specified curing temperature and to retain moisture in concrete. Blankets shall be lapped (8 inches minimum) and shall be free of holes. Blankets shall be secured at laps and edges to prevent moisture from escaping.

**4. Steam Method**. After placement of the concrete, members shall be held for a minimum four-hour pre-steaming period. If the ambient air temperature is below 50ºF, steam shall

be applied during the pre-steaming period to hold the air surrounding the member at a temperature between 50ºF and 90ºF. When the ambient air temperature is above 50ºF, the member shall remain undisturbed in the ambient air for a four-hour pre-steaming period.

To prevent moisture loss on exposed surfaces during the pre-steaming period, members shall be covered with a moisture-tight covering as soon as surface finishing is complete or the exposed surfaces shall be kept wet by an approved fog spray. The moisture tight covering shall be removed just prior to initiating the steam curing. Alternatively, the segment enclosure shall be fully closed and the relative humidity shall be maintained at 95% or higher. Curing period shall be a minimum of 12 hours.

Enclosures for steam curing shall allow free circulation of steam around all surfaces of the segment either formed or exposed and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture. These enclosures may also provide the required weather protection during conveying, placement and curing of the concrete if they are substantial enough to prevent wind and rain damage during the casting operations.

Steam at the jets shall be low pressure and in a saturated condition. Live steam shall not be directed on the concrete, test cylinders, or forms such as to cause localized high temperature. During application of the steam the temperature rise within the enclosure shall not exceed 40ºF per hour. The curing temperature shall at no point within the enclosure exceed 150ºF and shall be maintained at a constant level for a sufficient time necessary to develop the required strength for handling at the time of form removal. The steam curing cycle shall include a gradual cooling period during which the rate of decrease in temperature shall not exceed 40ºF per hour. The steam curing cycle shall include the gradual cooling period until the temperature inside the enclosure is within ±20ºF of the outside ambient temperature.

The Precaster shall provide temperature-recording devices to make an accurate, continuous and permanent record of the curing temperature. At least two continuous temperature records per casting machine are required

Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.

The match-cast segment shall be contained within the same curing environment (temperature and humidity) as the segment being steam-cured, throughout the initial curing process.

**5. Radiant Heat Method.** Enclosures for radiant heat curing shall allow free circulation of heat around all surfaces of the segment either formed or exposed. Measures shall be taken as soon as possible after casting to prevent moisture loss on all exposed surfaces.

During application of heat, the temperature rise within the enclosure shall not exceed 40ºF per hour. The curing temperature shall at no point within the enclosure exceed 150ºF and shall be maintained at a constant level for the time necessary to develop the required strength for removal of forms. A gradual cooling period, during which the rate of decrease in temperature in the enclosure shall not exceed 40ºF per hour, shall be included in the curing cycle. This cycle shall include the gradual cooling period until the temperature inside the enclosure is within ±20ºF of the outside ambient temperature. Curing period shall be a minimum of 12 hours.

The Precaster shall provide temperature-recording devices to make an accurate, continuous and permanent record of the curing temperature. At least two continuous temperature records per casting machine are required

Control cylinders shall be covered to prevent moisture loss and placed in a location where temperature is representative of the average temperature in the enclosure.

The match segment shall be contained within the same curing environment (temperature and humidity) as the segment being radiant-heat cured, throughout the initial curing process.

**K. Final Curing of Concrete Segments.** Except for segments cured by the Steam or Radiant Heat Methods, minimum curing of a precast segment period shall continue after the initial curing

period, by the application of a membrane-curing compound (conforming to the requirements of AASHTO M 148) to all exposed surfaces - except the segment face against the bulkhead to be used as the next match-cast face.

A Type 1 clear compound shall be used on all other exterior surfaces. The membrane-curing compound shall be of a consistency suitable for spraying at temperatures prevalent at the time of construction operations, and which forms a continuous, uniform film. It shall be free from precipitated matter caused by conditions of storage or temperature. The compound shall be relatively nontoxic. After separating a segment from the bulkhead, this face shall have an approved de-bonding compound applied to serve both as a bond breaker for the next match casting operation and as a curing compound.

The membrane-curing compound shall remain intact through the minimum curing period of five days or until the required 28 day strength is achieved for the segment. Under no circumstances shall the concrete surfaces be allowed to dry prior to curing compound application. Upon completion of the curing period (attaining 28 day strength) the segments may be shipped for erection.

Curing compound delivered to the job in drums shall be in the manufacturer's original container, labeled with the manufacturer's name, plant location, grade designation of compound, lot number and quantity. Curing compound delivered in bulk shall be supplied from and delivered to storage tanks designed to provide thorough agitation by means of compressed air. Thorough agitation shall be performed prior to shipment from manufacturer's plant and prior to use at job site.

Membrane curing compound shall be mixed with a mechanically operated mixer immediately before each use to provide uniform consistency. Application shall be in accordance with the manufacturer's recommendations, subject to the rate of application specified herein. The rate of application for membrane curing compound shall be at least one gallon per 150 square feet. If a surface is dry after stripping forms, the concrete shall immediately be thoroughly wet with water and the curing compound applied just as the surface film of water disappears. If curing compound is to be applied by spraying, the sprayer shall be compressor driven and of sufficient size to provide uniform mist.

Standby equipment will be required in case of mechanical failure. Hand held pump-up sprayers will be permitted for standby equipment. However, the hand held pump-up sprayers shall not be used except in case of mechanical failure. The membrane curing compound covering shall be continuous, flexible and without defects. Failure to comply with these requirements will result in suspension of further concrete placements until proper control is re-established.

Curing compound shall be applied to create a uniform appearance from one segment to the next. If it is determined by the Engineer that the curing compound creates a visual difference in the color of the segments the exterior surfaces shall be lightly sandblasted to remove the color variation. All surface treatment resulting from an inconsistency in concrete color, shall be performed by the Contractor / Precaster with no additional compensation.

**L. Finished Surfaces of Concrete Segments.** All surfaces of precast segments shall receive a Class 1, Ordinary Surface Finish as described in Subsection 501.14. In addition to the Class 1 Finish, all exterior surfaces of the precast segments that are exposed to view in the finished structure will be finished by rubbing with burlap and grout composed of equal parts of cement and clean, sharp sand to produce a smooth surface of uniform color and appearance.

**M. Precast Segment Handling, Storage, and Shipment.**

**1. General.** It is the intent of this project that precast segments be cast and placed into the structure with zero defects.

Care shall be exercised in the handling of segments to prevent damage to them. Handling shall only be by devices approved for the purpose. Lifting devices incorporated into any segment shall be adequate to distribute the handling and erection stresses so as not to damage the segment.

The Precaster and Contractor shall inspect each segment visually for evidence of damage or defect before, during and after critical operations and as often as necessary to ensure adequate quality control. The Precaster and Contractor shall immediately bring all such evidence of damage or defect to the attention of the Engineer. The extent and frequency of inspection by the Engineer for quality assurance is the Engineer's

prerogative. Segments may be inspected at any time during construction as deemed necessary by the Engineer to monitor compliance with this specification.

**2. Storage and Shipping.** Segments shall be stored level in the upright position and shall be firmly supported at the end of the column segment. The storage area of the segments shall be sufficiently stable to prevent differential settlement of the segment supports. Any evidence of damage or distress, as determined by the Engineer, resulting from stacking of segments shall cause to discontinue this practice immediately.

Prior to shipment from the precasting yard, each segment shall be inspected for any damage. The faces of all match cast joints shall be thoroughly cleaned of laitance, bond breaking compound and any other foreign material by wire brushing, light sandblasting or light water blasting. During transport segments and particularly the post-tensioning ducts, will be protected from possible contaminants including road deicing chemicals; salt water; and others that might affect the long-term durability or affect the appearance of the segments. During transport, firm support at the bearing locations noted above for support during storage shall be provided and the segments shall be fully secured against shifting. Upon arrival at the erection site, each segment shall again be inspected. If any damage has occurred during shipment, the Contractor shall immediately notify the Engineer. Erection of such damaged segments into the structure shall not proceed without authorization from the Engineer.

**P. Damaged or Defective Segments.**

**1. General.** Isolated defects are imperfections or damage that may occur randomly and infrequently. Recurring defects are imperfections or damages of the same general type and nature, which continue to be found in the same general location of the segments at an unacceptable frequency, as determined by the Engineer.

As a minimum, the first five segments cast will be jointly inspected by the Engineer, the Precaster, the Contractor and the Contractor's Engineer after casting, after moving to storage from the casting machine, before and after erection. All segment defects shall be identified and categorized during this inspection. The Precaster, Contractor and Contractor's Engineer shall examine the defects and propose to the Engineer, in writing:

a. The measures to be taken to prevent recurring defects in future segments.

b. The method of repair of all defects discovered as a result of the inspection as required herein.

If recurring defects continue following implementation of preventive measures, or as detected at any time during the construction, the Engineer will instruct the Contractor, in writing, to cease operations producing such defective segments.

The Precaster, Contractor and Contractor's Engineer shall examine the defects and propose to the Engineer, in writing:

(1) Measures to be taken to prevent recurring defects in future segments, and

(2) Method of repairing all defects discovered as a result of the inspection as required herein.

**2. Classification of Damage or Defects.** The Engineer will determine what constitutes damage or defect, whether the damage or defect is isolated or recurring, and will categorize it according to the following:

a. Cosmetic: Cosmetic defects or damages are those which do not affect the ability of the segment to resist construction or service-loads or reduce the life expectancy of the structure. This category includes superficial discontinuities such as non-structural cracks less than 0.024" wide, small spalls or honeycombed areas, entrapped air pockets (bug holes) or any defect that does not extend beyond the centerline of any reinforcing steel, or to any elements of the post-tensioning system. However, the Engineer may designate cosmetic defects of other types.

Repair of cosmetic or superficial defects shall be made in such a manner that the aesthetics and the structural integrity of the segments are restored in accordance with this specification.

b. Structural: This includes any defect which will impair the ability of the segment to adequately resist construction or service loads or reduce the life expectancy of

the structure. Any defect or damage that extends beyond the centerline of any reinforcing steel or into any element of the post-tensioning system is considered a structural defect. Examples of such defects include cracks wider than 0.025", large spalls and honeycombed areas, major segregation or breakage of concrete. However, the Engineer may designate cosmetic defects of other types.

The Contractor's Engineer shall be responsible for construction load analysis, service load analyses and life expectancy determinations.

Repair of structural defects shall such that the aesthetics and structural integrity of the segment shall be completely restored to a condition expected, had the defect or damage had not occurred.

c. Rejectable: These are any defects or damage, as determined by the Engineer, that will impair the ability of the segment to adequately resist service loads or construction loads, or will reduce the life expectancy of the structure and which cannot be successfully repaired such that the structural integrity is completely restored.

Any segment with a rejectable defect shall be removed from the work and replaced at no additional cost.

The Engineer for the following reasons may reject damaged or defective segments:

(1) Failure of the Contractor's Engineer to approve proposed repair procedures.
(2) Failure of the Contractor to execute the repair according to the approved procedure.
(3) Rejection by the Engineer of the proposed repair procedure or repair.
(4) Failure of the Contractor to provide the required certification or demonstration that the repair was successful and that the defect no longer exists, as required below.
(5) Failure of the Contractor to eliminate recurring defects.
(6) Determination by the Engineer that the work or materials used in the work does not meet other requirements of the Contract Documents and is not acceptable.

**3. Repairs.** Cosmetic repairs shall only be made following procedures prepared by the Contractor, submitted in writing to and approved by the Engineer. The Contractor's repair procedure shall identify those areas requiring repair prior to post-tensioning, and those that must be repaired after post-tensioning.

Structural repairs shall be made in accordance with Section 5 below or by following procedures prepared by the Precaster/Contractor. The repair procedure shall be signed and sealed by the Precaster's/Contractor's Engineer and shall be submitted to the Engineer for review and approval. The proposal shall include the following minimum information:

a. A detailed description and sketch of the defect.
b. The magnitude and type of the most critical construction loading condition to which the defective area will be subjected.
c. Detailed reinforcement requirements, material types, surface treatments, curing methods and general repair procedures proposed. The procedure shall clearly indicate those areas requiring repair before erection, and those areas to be repaired after erection.
d. The nondestructive testing method and procedure by which the Contractor shall demonstrate that the defect no longer exists and the segment has been restored to a condition to be expected had the defect or damage not occurred. In lieu of physical demonstration, on a case-by-case basis, the Contractor may be allowed to substitute a written certification by the Contractor's Engineer that the repair has been performed satisfactorily and that the defect no longer exists.

**4. Repairs to Shear Keys.** Repairs to the shear keys shall be made only after the segments have been erected. When 25 percent or more of the shear keys have been damaged such that they cannot effectively transfer the shear across the joint, as determined by the Engineer, then the damaged shear keys shall be repaired after the segments have been erected and initially stressed together with no more than 10 percent of the final prestressing force applied across the joint. After the repair has been completed and has

obtained a minimum compressive strength of 3500 PSI, the final prestressing force may be applied across the joint.

If more than 25 percent of the shear keys have been damaged, the Precaster/Erector/Contractor shall advise the Engineer. The Engineer shall make a structural assessment and shall advise on an appropriate course of action.

**5. Procedures for Repair and Patching of Segments.**

a. Deep Voids in the Segment. Void depths greater than 2" (but less than one-half of the local section thickness) and with a surface area greater than 6 square inches shall be categorized as "Structural Repairs" and the repair procedure shall be as follows.

Saw cut the perimeter of the affected area to a depth of at least ½". Chip away all partially consolidated material until sound concrete is encountered. If reinforcement passes through the void, expose the full diameter plus ½". The exposed portions of reinforcement shall be cleaned until they are free of concrete. If dirt, oil or paint is present, remove using 3,000 psi water blasting or sand blasting. Remove all other debris with compressed air. Parent concrete shall be in a saturated surface dry condition without any standing water prior to placement of patching concrete. Attach wood or steel forms as necessary to contain the patching concrete.

Coat all surfaces of the void with Sika Armatec 110 EpoCem bonding agent (or other suitable material as approved by the Engineer). Fill the void with concrete of the same mix design as the segment, cover and cure.

Finish the patched area to match the surrounding concrete.

b. Shallow Voids (less than the cover). Voids shallower than the cover depth and smaller than 6 square inches in surface area are categorized as "Cosmetic" Repairs. The repair procedure shall be as follows.

Saw cut the perimeter of the void to a depth of ½". Chip away all partially consolidated material until sound concrete is encountered. If dirt, oil or paint is present, remove using 3,000 psi water blasting or sand blasting. Remove all other debris with compressed air. Parent concrete shall be in a saturated surface dry condition without any standing water, or prepared as per the recommendations of the manufacturer of the patching material. Fill the void with SikaTop 123 Plus no sag mortar, (or other suitable material as approved by the Engineer) as per the recommendations of the manufacturer.

Finish the patched area to match the existing concrete.

c. Voids on a Match Cast Face (or in Shear Keys). Depending upon the size of the void, either a. or b. above shall be used. However, the patch shall be held back by ½" from the match cast face. After erection, the resulting void shall be patched in the field.

d. Cracks. Cracks are classified as Structural or Non-Structural. Structural cracks are those induced by external forces that produce internal stresses exceeding the tensile strength of the concrete. Nonstructural cracks are those that appear as a result of component material characteristics, atmospheric effects and local constraints or shrinkage. The Precaster/Contractor shall notify the Engineer of any cracks and the Engineer shall determine the classification. The Precaster/Contractor shall not seal or repair structural cracks without approval in advance by the Engineer.

Non-structural cracks shall be treated as follows:

(1) In aggressive environments: cracks less than 0.006" wide shall be sealed with a penetrating sealer. Cracks from 0.006" to 0.024" wide shall be injected with epoxy according to the procedure below. Cracks wider than 0.025" shall be investigated further.

(2) In moderate or slightly aggressive environments, cracks less than 0.006" wide need no treatment. Cracks from 0.006" to 0.024" wide shall be coated with an approved penetrating sealer. Cracks wider than 0.025" shall be investigated further.

Procedure for Epoxy Injection:

#1. Drill holes and install plastic injection ports at approximately 8" on center.

#2. Seal crack between ports with Sikadur-32 epoxy or other similar material approved by the Engineer.

#3. Inject crack with a hand pump using Dayton Superior, Sure Inject J-56 epoxy or other similar material approved by the Engineer. Begin injection from the lowest port and continue until the epoxy runs out of the next highest port. Then move to the next port and repeat the process until the entire crack is filled.

e. Entrapped Air Pockets (Bug Holes). These are considered "Cosmetic". The exterior surface of the segment, except the top deck shall have all entrapped air pockets filled and the surface sacked with burlap. No entrapped air pockets on the match cast faces or the inside (void) surfaces shall be filled or sacked.

f. Other Situations. Situations other than those mentioned above shall be analyzed on a case-by-case basis and repaired only after approval by the Engineer.

**Q. Payment for Segments with Cosmetic Defects or Repairs.** Segments with cosmetic defects will be paid for according to the contract unit price per cubic yard. However, such payment is subject to review by the Engineer, and failure of the Contractor to prosecute the required repairs properly and in a timely manner shall be cause for withholding of payments sufficient to protect the Engineer's interests.

Segments with structural defects will not be paid for until the repair procedure is complete and the segment is certified or demonstrated to be free of structural defect as required.

Segments that require repairs must be repaired to the satisfaction of the Engineer prior to leaving the casting yard.

## ERECTION OF PRECAST SEGMENTS

**523.05 Erection of Precast Segments.**

An erection scheme for handling and erecting segments is shown in the plans. The erection scheme is a concept only, consistent with the overall bridge design. It is presented to aid the Contractor in developing his method of construction that is also to be consistent with the overall bridge design. The Contractor shall be solely responsible for design, fabrication, assembly and operation of all equipment to be used for handling and erecting segments.

Erection of segments shall not begin until the required shop drawings calculations have been reviewed and approved by the Engineer. No extra payment will be made to the Contractor for any cost incurred in modifying the permanent structure due to temporary loadings induced by the Contractor's handling and erection equipment or his erection scheme.

Elevations and alignment of segments shall be carefully measured at each stage of erection with instruments capable of providing the degree of accuracy necessary to assure satisfying erection tolerances. Any deviation from the table of elevations and alignment prepared by the Contractor shall be corrected so as to prevent accumulation of deviations using a method submitted by the Contractor and approved by the Engineer.

**A. Age of Precast Segments at Time of Erection.** Precast segments shall not be erected until they have reached the age of 14 days and have obtained the minimum strength specified on the Plans.

**B. Temperature of Precast Segments with Epoxy Joints.** Erection of segments will be permitted only when the substrate temperatures of the mating surfaces are between exceed 40ºF and exceed 105ºF. Upon approval of the Engineer, an artificial environment may be provided to maintain the substrate temperature within the permissible limits by creating an enclosure heated by circulating warm air or by radiant heaters. Localized heating shall be avoided and the heat shall be provided in a manner that prevents surface temperatures greater than exceed 95ºF during the epoxy hardening-period. Direct flame heating of concrete will not be permitted. The requirements of the Special Provision for "Epoxy Joining of Precast Concrete Segments" shall apply.

**C. Erection Tolerances.**

1. **Cumulative Erection Tolerances for Precast Piers.** Vertically, the angular deviation from the theoretical slope change between successive segments shall not exceed 0.002 Radians. The maximum overall deviation from the vertical, measured in any direction, shall not exceed 0.01 inch per foot of height. The maximum variation from the plan location shall not exceed 1 inch at the bottom and 2 inches at the top.

**D. Cast-in-Place Closure Joints and Filling of Blockouts.**

**1. Concrete.** Concrete for closure joints, closure segments and filling of blockouts shall comply with the same specifications, compressive strength and criteria as the concrete in the precast segments, or as approved by the Engineer. It shall be carefully placed, consolidated and cured to provide dense, uniform concrete, free from blemish. Casting, curing and finishing shall be in accordance with the Project Specifications and procedures prepared by the Erector and approved by the Engineer.

**2. Strength at Transfer (Application of Prestress).** The closure concrete shall reach a minimum required shown on the Plans and Project Specifications prior to stressing any post-tensioning.

**3. Formwork for Closures.** Formwork for closures shall be adequately supported to take all loads applied and shall not be removed until the concrete in the joints has reached its required strength and the longitudinal tendons have been stressed. The formwork and release agent shall be of a type to provide the required surface finish to match that of the precast segments.

**E. Packed Mortar Joints.** Where designated on the plans, a packed mortar joint or grouted pad shall be made after the precast element has been set at the proper final elevation.

For packed mortar joints, a form shall be built around the joint leaving one side open. The form shall be properly secured so as to withstand the required packing forces. Insert a small amount of mortar into the open joint; just enough to have a two-inch thick bead on the opposite side of the opening against the form. Pack this bead by striking a special tool with a two-pound hammer. Continue the compaction until water begins to bleed out of the mortar. (The water bleeding out of the mortar is evidenced on the tool, on which the mortar will begin to adhere.) At that time, insert another bead of mortar as described before, and pack it the same way. Continue this process until the joint is filled to the limits specified on the plans. A correctly packed mortar joint can be immediately loaded.

**F. Final Clean Up.** Before final acceptance, the Contractor shall clean the interior of the concrete box of all rubbish, excess materials, loose concrete, dirt and debris. The interior of the box girders shall then be swept out. The final clean up shall be performed after all work on the interior of the box girders, including grouting of all tendons and utility work included in the contract, has been completed.

## METHOD OF MEASUREMENT

**523.06 Method of Measurement.**

Precast substructure segment concrete, including cast-in-place concrete for closure joints and closure segments will not be measured and payment will be made for the quantity in the Proposal adjusted for Change Orders except as provided for in Subsection 109.01.

All reinforcement in precast substructure segments, including cast-in-place joints, shall be measured by weight according to quantities represented by reinforcement details on the contract plans or approved shop drawings in accordance with Subsection 109.01; whichever is the lesser.

## BASIS OF PAYMENT

**523.07 Basis of Payment.**

The accepted quantities will be paid for at the contract unit price per cubic yard of concrete (including high performance concrete requirements) and pounds of reinforcing steel. (Payment for prestressing shall be in accordance with the Special Provision for "Post-Tensioning System"). Payment shall be full compensation for manufacturing and assembling the precast segments complete in place in the bridge, including filling all concrete blockouts, for supply and application of epoxy bonding agent as required, for embedded prestressing ducts and anchorage hardware, for segment access details, cast-in-place joints, dry packing, for sealing the match cast joints, and all other materials, testing, and all the equipment, tools, forms, labor and incidental items required to complete the work.

No additional payment will be made for extra concrete, reinforcing steel and prestressing necessitated by approved modifications to the segments or structure for the purposes of the Contractor's construction methods. Nor will payment be made for temporary tendons which are approved to be left in the structure, either stressed or unstressed, for the convenience of the Contractor's operations.

Periodic partial payment will be made for precast concrete segments stored in the casting yard. Payment will be made for 65 percent of the completed ratio bid price for substructure concrete, and reinforcement in the

segments when the segment has been cast and accepted by the Engineer. Payment for prestressing which is an integral part of the precast segment shall be paid in accordance with Section 524. Payment for 30 percent of the bid prices stated above will be made when the segment has been erected and epoxy joining and post-tensioning have been completed in an acceptable manner. The remaining five percent of the bid prices will be paid when all necessary repairs and finishing of the concrete surfaces have been completed and accepted. All payments shall be subject to retainage as specified elsewhere.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| CONCRETE IN SUBSTRUCTURES, PRECAST 8000 PSI, HPC | CUBIC YARD |

Segments with cosmetic defects will be paid for according to the Contract unit price per cubic yard. However, such payment is subject to review by the Engineer, and failure by the Contractor to prosecute the required repairs properly and in a timely manner shall be cause for withholding of payments sufficient to protect the Engineers interests.

Segments with structural defects will not be paid for until the repairs procedure is complete and the segment is certified or demonstrated to be free of structural defect as required.

Segments that require repair must be repaired prior to leaving the casting yard.

## SECTION 524 – POST TENSIONING SYSTEM

**524.01 General .**

**A. Description.** The work specified in this Section shall consist of furnishing, installing, stressing and grouting prestressing steel in accordance with the details shown on the plans and the requirements of these Specifications.

It shall also include the furnishing and installing of any appurtenant items necessary for the particular prestressing system used, including but not limited to anchorage assemblies, additional reinforcing bars required to resist stresses caused by anchorage assemblies, ducts, vents, inlets, outlets and grout used for pressure grouting ducts.

**B. Definitions and Terminology.** The following terms apply to prestressing of segmental bridge construction:

**1. Post-Tensioning:** The application of a compressive force to the concrete by stressing tendons or bars after the concrete has been cast and cured. The force in the stressed tendons or bars is transferred to the concrete by means of anchorages.

**2. Post-Tensioning Scheme or Layout:** The pattern, size and locations of post-tensioning tendons provided by the Designer on the Contract Plans.

**3. Post-Tensioning System:** A proprietary system where the necessary hardware (anchorages, wedges, strands, bars, couplers, etc.) is supplied by a particular manufacturer or manufacturers of post-tensioning components.

**4. Tendon:** A single or group of prestressing elements and their anchorage assemblies, which impart prestress to a structural member or the ground. Also included are ducts, grouting attachments and grout. The main prestressing element is usually a high strength steel member made up of a number of strands, wires or bars.

**5. Strand:** An assembly of several high strength steel wires wound together. Strands usually have six outer wires wound in long-pitch helix around a single straight wire of a similar diameter.

**6. Wire:** A single, small diameter, high strength steel member and, normally, the basic component of strand, although some proprietary post-tensioning systems are made up of individual or groups of single wires.

**7. Bar:** Post-tensioning bars are high strength steel bars, normally available from 5/8" to 1-3/4" diameter and usually threaded with very coarse thread.

**8. Coupler:** The means by which the prestressing force may be transmitted from one partial-length prestressing tendon to another.

**9. Anchorage:** An assembly of various hardware components that secure a tendon at its ends after it has been stressed and imparts the tendon force into the concrete.

**10. Anchor plate:** that part of the anchorage hardware that bears directly on the concrete and through which the tendon force is transmitted.

**11. Wedge:** A small conically shaped steel component placed around a strand to grip and secure it by wedge action in a tapered hole through a wedge plate.

**12. Wedge Plate:** A circular steel component of the anchorage containing a number of tapered holes through which the strands pass and are secured by conical wedges.

**13. Set (Also Anchor Set or Wedge Set):** Set is the total movement of a point on the strand just behind the anchoring wedges during load transfer from the jack to the permanent anchorages. Set movement is the sum of slippage of the wedges with respect to the anchorage head and the elastic deformation of the anchor components. For bars, set is the total movement of a point on the bar just behind the anchor nut at transfer and is the sum of slippage of the bar and the elastic deformation of the anchorage components.

**14. Anticipated Set:** Anticipated set is that set which was assumed to occur in the design calculation of the post-tensioning forces immediately after load transfer.

**15. Bleed:** the autogenous flow of mixing water within or its emergence from, newly placed grout; caused by the settlement of the solid materials within the mass.

**16. Duct:** material forming a conduit to accommodate post-tensioned tendon installation.

**17. Initial Set of Grout:** a degree of stiffening of the grout mixture less than the final set, indicating the time in hours and minutes required for the grout to stiffen sufficiently to resist to an established degree, the penetration of a weighted needle test.

**18. Final Set of Grout:** a degree of stiffening of the grout mixture greater than the initial set, indicating the time in hours and minutes required for the grout to stiffen sufficiently to resist to an established degree, the penetration of a weighted needle test.

**19. Fluidity:** A measure of time, expressed in seconds, necessary for a stated quantity of grout to pass through the orifice of the flow cone.

**20. Grout:** a mixture of cementitious materials and water, with or without mineral additives or admixtures, proportioned to produce a pumpable consistency without segregation of the constituents; injected into the duct to fill the space throughout the prestressing steel, anchorages and ducts.

**21. Inlet (also inlet pipe or grout injection port):** small diameter tubing or duct used for injection of grout into a duct.

**22. Outlet (also ejection pipe or grout outlet vent or vent):** a small diameter tubing or duct used to allow the escape of air, water, grout and bleed water.

**23. Thixotropic:** the property of a material that enables it to stiffen in a short time while at rest, but to acquire a lower viscosity when mechanically agitated, the process being reversible. Grouts having thixotropic properties can be highly resistant to bleed. Admixtures that may produce thixotropic properties include anti-bleed admixtures and silica fume.

B. **Contractor Proposed Options.** The Contractor may not propose any variations from the prestressing systems shown in the contract documents.

C. **Restrictions to Contractor Proposed Options.** The Contractor may not propose any variations from the prestressing systems shown in the contract documents.

D. **Shop Drawings.** The Contractor shall submit detailed shop drawings in accordance with section 105.04 that include, but are not limited to:

1. A complete description of, and details covering, each of the prestressing systems to be used for permanent and temporary tendons. This shall include:
   a. .Designation of the specific prestressing steel, anchorage devices, bar couplers, duct material and accessory items.
   b. Properties of each of the components of the prestressing system.
   c. Details covering assembly of each type of prestressing tendon.
   d. Equipment to be used in the prestressing sequence.
   e. Procedure and sequence of operations for prestressing and securing tendons.
   f. Procedure for releasing the prestressing steel elements.
   g. Parameters to be used to calculate the typical tendon force such as; expected friction coefficients, anchor set and prestress steel relaxation curves.
2. A table of jacking forces and initial elongations of each tendon at each stage of erection for all prestressing will only be required if the parameters used to calculate the typical tendon force differs from the Plans.
3. Complete details of the anchorage system for prestressing including certified copies of the reports covering tests performed on prestress anchorage devices as required in the following

Materials Section D, and details for any reinforcing steel needed due to stresses imposed in the concrete by anchorage plates.

4. For the operation of grouting prestressing tendons; the materials and proportions for grout, details of equipment for mixing and placing grout and methods of mixing and placing grout; also, locations and details of inlets and outlets for grouting and the direction of grouting.

5. Elongation calculations shall be revised when necessary to properly reflect the modulus of elasticity of the wire or strand as determined from in-place friction testing in accordance with the following Materials Section J.2.

6. Complete details of the apparatus and method to be used by the Contractor for the test required by the following Materials Sections J.2 and J.3.

## MATERIALS

**524.02 Materials.**

**A. General.** The materials to be incorporated into work covered by this Section shall conform to the requirements set out herein.

**B. Prestressing Steel.**

1. **Strand:** Unless otherwise noted on plans, strand shall be coated, Grade 270, (1860 MPa) low relaxation 7-wire strand conforming to requirements of ASTM A-416. The coating shall conform to ASTM A882.
2. **Thread-Bar:** Unless otherwise noted on the plans, prestress bars shall be uncoated, Grade 150 (1035 MPa), high strength deformed thread bars conforming to the requirements of ASTM A-722, Type II.
3. **Wires:** Unless otherwise noted on the plans, wire shall be uncoated, low relaxation wire conforming to the requirements of ASTM A-421.

**C. Thread-Bar Couplers.** Thread-bar couplers shall meet the requirements of ASTM A-722. Bar couplers shall be used only at locations specifically shown on the plans or approved by the Engineer. A bar coupler shall develop at least 95 percent of the required ultimate strength of the bar with a minimum elongation of two percent when tested in the unbonded condition measured in 10 foot gauge lengths, without failure of the coupler or the thread-bar.

Testing of couplers shall be performed using samples of the prestressing bar to be used on the project. The test specimen shall be assembled in an unbonded state and, in testing, the anticipated set shall not be exceeded.

Only threaded type couplers shall be used with post-tensioning thread bars. Post tensioning thread-bars shall be threaded into ½ the length of the coupler $\pm$ 1/4 inch so that when two bars are mated in a coupler, the length of each bar positively engaged in the coupler shall be half the coupler's length within the acceptable tolerances. No coupling or splicing will be permitted with strands.

**D. Prestress Anchorages.** All prestressing steel shall be secured at the ends by means of permanent type anchoring devices. Anchors manufactured from composite materials will not be allowed. Prestress anchorages shall develop at least 95 percent of the minimum specified ultimate tensile strength of the prestressing steel. Wedges shall be three-part (Two part wedges shall not be used).

Testing of anchorage devices shall be performed using samples representing the type of prestressing steel and concrete strength to be used on the project. The test specimen shall be assembled in an unbonded state and, in testing, the anticipated anchor set shall not be exceeded. Certified copies of test results for the anchorage system shall be supplied to the Engineer. The anchorage system shall be so arranged that the prestressing force in the tendon may be verified prior to the removal of the stressing equipment.

For tendon anchorages, the design and furnishing of any reinforcement (in addition to the reinforcement shown on the plans) which is needed to resist bursting and splitting stresses imposed on the concrete by the proposed anchorage system shall be the responsibility of the Contractor at his expense.

Prestress anchorage devices shall effectively distribute prestressing loads to the concrete and shall conform to the following requirements.

1. The bearing stress in the concrete created by the anchorage plates shall comply with Section 9.2.1 of the AASHTO Standard Specifications (16th Edition, 1996) or, alternatively, with Section 5 of the AASHTO LRFD Bridge Design Specification, 2nd Edition, 1998.

2. Bending stresses in the plates or assemblies induced by the pull of the prestressing steel shall not exceed the yield point of the material in the anchorage plate when 95 percent of the ultimate strength of the tendon is applied. Nor shall it cause visual distortion of the anchor plate as determined by the Engineer.

**E. Ducts.**

**1. General.** All duct material shall be sufficiently rigid to withstand loads imposed during placing of concrete and internal pressure during grouting while maintaining its shape, remaining in proper alignment and remaining watertight.

The duct system, including splices and joints shall effectively prevent entrance of cement paste or water into the system and shall effectively contain pressurized grout during grouting of the tendon. The duct system shall also be capable of withstanding water pressure during flushing of a duct in the event the grouting operation is aborted.

The interior diameter of ducts for single strand, bar or wire tendons shall be at least 1/4 inch greater than the nominal diameter of the tendon. The interior diameter of ducts for tendons consisting of more than one strand, bar or wire shall be such that the interior area of the empty duct is not less than 2.25 times the net area of the prestressing steel.

**2. Duct Type Designation.**

Key to Duct Material:

A - Galvanized Rigid Steel Pipe
B - Corrugated Metal
C - Corrugated Plastic
D - Smooth Plastic

Except as otherwise designated in the plans, the type of duct material used in specific applications shall be as follows:

| Number of Strands in Tendon | | Tendon Radius (R) Ft. | Duct Type Material |
|---|---|---|---|
| 0.5"Ø | 0.6"Ø | | |
| ---------- | 4 (Transverse Flat Duct) | 10 or more | C |
| 1 to 13 | 1 to 8 (Round Duct) | 30 or more<br>10* to 30<br>2 to 10 | A, B, C<br>A, B<br>A |
| 14 to 18 | 9 to 13 | 30 or more<br>12* to 30<br>2.5 to 12 | A, B, C<br>A, B<br>A |
| 19 to 32 | 14 to 20 | 50 or more<br>25* to 50<br>3 to 25 | A, B, C<br>A, B<br>A |

* This radius is the minimum allowed for a tendon unless otherwise approved by the Engineer based on test data.

NOTES:
- Type D duct material shall only be used for those portions of a tendon not embedded in concrete.
- External ducts shall be Type D.
- Type C duct material shall be used for internal tendons in environments designated as aggressive exposure. Areas of aggressive exposure are noted in the Contract Plans.
- Type B duct material shall be used only in non-aggressive exposure conditions.

**F. Specific Material Properties of Ducts and Attachments.**

**1. Type A - Galvanized Rigid Steel Pipe.** Steel pipe duct shall be galvanized steel pipe conforming to the requirements of ASTM A-53, Type 3, Grade B. The nominal wall thickness of the pipe shall not be less than that of Schedule 40. The pipe shall be bent so as to accurately conform to the alignment of the tendon taking into consideration the minimum bending radius shown in the contract plans or shop drawings.

**2. Type B - Corrugated Metal.** Corrugated metal duct shall be fabricated with either welded or interlocked seams and bent without crimping or flattening. Sections of duct

shall be connected with positive ferrous metal connectors that prevent angle changes at joints.

Duct and metal connectors shall be fabricated from galvanized sheet steel meeting the requirements of ASTM 525, Coating Designation G90. Areas of zinc coating damaged by welding or in fabricating interlocked seams shall be repaired with zinc duct-zinc oxide paint conforming to Federal Specifications TT-P-640 or MIL-P-21035.

Joints between sections of duct shall have no sharp edges within contact of the prestressing steel.

For strand and wire tendons, the duct thickness shall be 26 gauge up to 2-5/8 inches diameter. Ducts larger than 2-5/8 inches diameter shall be 24 gauge. For bar tendons, the duct thickness shall not be less than 31 gauge.

3. **Type C - Corrugated Plastic (HDPE or HDPP).** Plastic duct shall be made of either high-density polyethylene (HDPE) or high-density polypropylene (HDPP). HDPE shall conform to ASTM D3350-98a, cell classification range 424432C to 335534C. HDPP shall conform to ASTM D4101, cell classification range PP210B43542 to PP210B65542.

   Plastic duct shall be corrugated with a pitch not less than 1/10 of the radius of the duct. Material thickness shall be 0.08 inches as manufactured, and 0.06 inches after tensioning.

   Corrugated plastic duct shall be designed so that a force equal to 40 percent of the ultimate tensile strength of the tendon will be transferred through the duct into the surrounding concrete in a length of 2.5 feet. Twelve static pull out tests shall be conducted to determine compliance of a duct with the force transfer requirement. If ten of these tests exceed the specified force transfer, the duct is acceptable. The Contractor shall provide to the Engineer certified test reports verifying that the duct meets specification requirements in regard to force transfer.

   To satisfy the intent of these tests, the results for static pull-out tests from previous projects utilizing identical duct and prestressing steel with similar concrete and grout material may be submitted to the Engineer in lieu of executing new pull-out tests. However, if the previous results are unacceptable or if there is a significant difference in the materials used, then the Contractor shall provide results from new tests for this project.

4. **Type D - Smooth Plastic for External Tendons.** Ducts for external tendons shall be black, smooth, high density polyethylene pipe (HDPE) with a minimum wall thickness of Do/18, where Do denotes outside diameter with a minimum Hydrostatic Design Basis (HDB) of 1250 psi conforming to one of the following designations:

   ASTM D 1248, Type III, Category 5, grade P33 or P34
   ASTM D 2239 or ASTM D 3035, cell classification PE345433C
   ASTM F 714, cell classification PE 345433C
   ASTM D 2447, grade P33 or P34

5. **Inlets and Outlets (Ports or Vents) for Grout.** Inlets (Grout Injection Ports) shall be provided for injecting grout into the duct. Outlets (Grout Exit Vents) shall allow the escape of air, water, grout, and bleed water. The inner diameter of inlets and outlets shall be at least 3/4 in. for strand tendons and 3/8 in. for single bar tendons.

   Inlets and Outlets shall be of flexible, HDPE or HDPP pipe.

   Plastic Components, if selected and approved, shall not react with concrete or enhance corrosion of the post-tensioning steel, and shall be free of water-soluble chlorides.

   Inlets and outlets shall be located and attached in accordance with Construction Requirements Section B.2 below.

**G. Minimum Radius of Curvature.** Tendons ducts shall preferably be installed with a radius of curvature of 20 feet or more. Ducts with sharper curvature down to a minimum of 10 feet shall have confinement reinforcement detailed to tie the duct into the concrete. Duct curvature with radii less than 10 feet may be approved by the Engineer based on review of test data. The minimum radius for corrugated polyethylene duct shall be 30 feet. The confinement reinforcement shall be proportioned in accordance with Section D.16.3 of the AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges.

**H. Sampling and Testing of Prestressing Elements.** All testing shall be done in accordance with ASTM Specifications.

The Contractor at his expense shall furnish the following samples of materials and devices selected at locations designated by the Engineer:

1. Three samples of seven foot long prestressing wire or bar for each size from each heat number or production lot.
2. Three samples of five foot long prestressing strand for each size from each heat number or production lot.
3. If bar couplers are to be used, three samples with two specimens each consisting of four foot lengths of the specific prestressing bar coupled with a bar coupler from the materials to be used on the project.
4. One unit of each prestress anchorage to be used on the project.
5. For each type of duct material intended for the project, one sample, four feet long, from each production lot or per 10,000 linear feet, whichever is greater.

Samples shall be furnished at least 90 days in advance of the time they are to be incorporated into the work.

The Engineer reserves the right to reject any material or device which is obviously defective or was damaged subsequent to testing.

**I. Manufacturer's Lots (Contractor's Quality Control).** The manufacturer of prestressing steel, prestress anchorages and bar couplers shall assign an individual number to each lot of strand, wire, bar or devices at the time of manufacture. Each reel, coil, bundle or package shipped to the project shall be identified by tag or other acceptable means as to Manufacturer's lot number. The Contractor shall be responsible for establishing and maintaining a procedure by which all prestressing materials and devices can be continuously identified with the manufacturer's lot number. Items which at any time cannot be positively identified as to lot number shall not be incorporated into the work.

Low relaxation strand shall be clearly identified as required by ASTM A-416. Any strand not so identified will not be acceptable.

The Contractor shall furnish manufacturer's certified reports covering the tests required by this Specification. A certified test report stating the guaranteed minimum ultimate tensile, yield strength, elongation and composition shall be furnished for each lot of prestressing steel. When requested, typical stress-strain curves for prestressing steel shall be furnished. A certified test report stating strength when tested using the type prestressing steel to be used in the work shall be furnished for each lot of prestress anchorage devices.

**J. Testing of Prestressing Tendons by the Contractor.**

**1. General.** The Contractor shall perform certain testing of prestressing tendons as specified herein.

**2. In-Place Friction Test of Tendons.** For the purpose of accurately determining the friction loss in stressing draped tendons, prior to stressing a draped tendon, the Contractor shall test, in place, a draped tendon selected by the Engineer. If deemed necessary by the Engineer to accurately establish friction loss, the Contractor shall perform tests on additional tendons selected by the Engineer. The test procedure shall consist of stressing a tendon at an anchor assembly with the dead end anchor incorporating a calibrated load cell. The results of the tests (loss due to friction and modulus of elasticity) shall be submitted to the Engineer. Apparatus and methods used to perform the tests shall be proposed by the contractor and be subject to the approval of the Engineer. The Contractor shall notify the Engineer at least two weeks in advance of performing a friction test.

**3. Dynamic Testing of Unbonded Tendons.** Unbonded tendons are defined as tendons located essentially external to the concrete. For unbonded superstructure tendons, the Contractor shall perform two dynamic tests on a representative specimen and the tendon shall withstand, without failure, 500,000 cycles from 60 percent to 66 percent of its minimum specified ultimate strength. In the second test the tendon shall withstand without failure 50 cycles from 40 percent to 80 percent of its minimum specified ultimate strength. The period of each cycle involves the change from the lower to the upper stress level and back to the lower. The specimen used for the second dynamic test need not be the same used for the first dynamic test. Systems utilizing multiple strands, wires, or bars shall be tested utilizing a test tendon of full size. The test tendon shall duplicate the

behavior for the full size tendon and generally shall not have less than 10 percent of capacity for the full size tendon. The Contractor shall notify the Engineer at least two weeks in advance of performing a dynamic test. In lieu of the dynamic testing, the Contractor may submit data from prior tests. Acceptance of data from prior tests is subject to the approval of the Engineer.

**K. Grout Materials and Properties.**

**1. General.** Grout for tendons shall consist of Portland cement, potable water, mineral admixtures for partial cement replacement and other specified or approved admixtures which impart low water content, flow, fluidity, minimum bleeding, non-shrink and, when necessary, set retarding properties to the grout. Also, when specified, the grout shall have enhanced corrosion-resisting properties such as increased resistance to chloride penetration. There shall be no deliberate addition of materials containing chlorides.

The Contractor may use commercial, prepackaged, cement-based grout mixtures, meeting the Requirements of this Specification, subject to the Engineers approval.

**2. Classification of Grouts.** Two classifications of grouts are used in this specification to reflect different requirements depending on exposure conditions. Aggressive exposures conditions are noted in the Contract Plans.

**Normal Grout** is to be used only in non-aggressive exposure conditions. The primary constituents of Normal Grout are cement and water. Chemical admixtures may be required, but mineral admixtures such as silica fume and fly ash would not normally be compulsory to meet the performance criteria for Normal Grout. In general, Normal Grout will not have thixotropic properties.

**Enhanced Grout** is to be used in all aggressive exposure conditions or as otherwise required for the project. Enhanced Grout will normally contain both mineral admixtures for partial cement replacement and chemical admixtures to provide improved corrosion protection and resistance to bleed. Enhanced Grout may or may not have thixotropic properties, depending on the admixtures used.

Both Normal Grout and Enhanced Grout may be in the form of commercial, prepackaged, cement-based grout mixtures, meeting the requirements of this Specification, and subject to approval by the Engineer.

In order to provide the required corrosion resisting properties, the grout ingredients and physical properties shall comply with the following Materials Sections K.3 through K.5, including Tables 1 through 5.

**3. Grout Ingredients.**

**a. Cement.** Portland cement shall conform to the requirements of Subsection 919.11. The cement shall be fresh and not contain lumps or other indication of hydration or "pack set". The Contractor shall furnish, for each shipment of cement, a manufacturer's report stating results of tests made on samples of the material taken during production or transfer and certifying compliance with the applicable requirements of AASHTO M-85.

**b. Cement Replacement for Enhanced Grout.** The following cementitious materials may be used for cement replacement in order to enhance the corrosion resisting and durability characteristics of grout used for aggressive environments.

**Silica Fume:** 5 to 15% replacement by weight of Portland cement

Silica Fume shall comply with ASTM C1240 “Silica Fume for Use in Hydraulic Cement, Concrete and Mortar”. **Fly-Ash (Class C):** 0 to 35% replacement by weight of Portland cement.

**Fly-Ash (Class F):** 0 to 25% replacement by weight of Portland cement.

Fly-Ash (Class C and Class F) shall conform to ASTM C618 “Coal Fly Ash or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete”.

**Slag:** 0 to 55% replacement by weight of Portland cement.

Slag shall comply with ASTM C989 “Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars”.

The water content shall be calculated for the total weight of cementitious material (cement + replacement material) and expressed as water/cementitious ratio.

**c.** **Water.** Water shall be potable, clean and free of injurious quantities or substances (chlorides, sulfides, sulfates and nitrates) known to be harmful to Portland cement or prestressing steel.

Water shall have chloride, sulfide, sulfate, and nitrate contents not greater than 500, 100, 650 and 13 ppm respectively.

Water used for grouting tendons shall be tested for the chemicals noted above at regular intervals not to exceed 120 days. Water shall be tested at the location where the water is placed into containers for the project. If the water is stored in containers, which might contaminate it (e.g. unlined metal tanks) then the Engineer can request that tests be performed on water coming from the storage tanks.

**d.** **Admixtures.** Admixtures shall comply with ASTM C494 "Standard Specification for Chemical Admixtures for Concrete – Types D, E, F or G".

Admixtures shall consist of chemicals that impart the following properties when incorporated into the grout mixture. These properties are low water content, good flow, fluidity, minimum bleeding (sedimentation of cement), expansion or non-shrink and, when necessary, increase in setting time. Any admixture containing chlorides, sulfites, fluorides or nitrates shall not be used in the grout. The date of manufacture and shelf life shall be clearly stamped on each container. No admixture shall be used for which the shelf life recommended by the manufacturer has expired.

**e.** **Non-Shrink Properties and Expansion Agents.** All grout shall have non-shrink properties. However, gas evolving expansion agents and/or additives containing free aluminum, shall not be used.

**f.** **Corrosion Inhibitors.** Corrosion inhibiting chemical admixtures shall not be used in any grout.

**g.** **Chloride Ion Content.** All constituent materials shall be such that the acid-soluble chloride ion content of any grout shall not exceed 0.08% by weight of Portland cement as measured by ASTM C1152 "Standard Test Method for Acid-Soluble Chloride in Mortar and Concrete."

**4.** **Grout Properties.** The Contractor shall determine the exact material proportions and admixture requirements to meet the requirements of this specification. Laboratory trial batches of the proposed grout mix shall be prepared using the same materials to be used on the job site. Trial batches shall be subjected to the tests described in this Section at a Laboratory approved by the Engineer to demonstrate that the proposed grout mix meets the requirements of this Specification. Testing shall be performed by personnel experienced in testing of grouts, and under temperature and humidity conditions expected at the site.

Laboratory testing requirements may be waived at the discretion of the Engineer if:

a. The Contractor proposes to use a commercial prepackaged grout that has previously met the requirements of this Specification as independently certified by a Laboratory approved by the Engineer; or

b. The results of earlier tests (not exceeding 12 months) on grouts with the same design, same material sources and same procedures are satisfactory and within the requirements of this Specification.

Prior to beginning grouting operations, the Contractor shall furnish the Engineer with a report detailing the results of all laboratory testing, including the types and number of tests performed, test procedures, results and comparison of results with specified values.

In order to qualify, **Normal Grout** shall have the physical properties listed in Table 1 when mixed, prepared and tested in a Laboratory approved by the Engineer.

In order to qualify, **Enhanced Grout** shall have the physical properties listed in Table 1 and Table 2 when mixed, prepared and tested in a Laboratory approved by the Engineer.

**Table 1 - Physical Property Requirements for Normal Grout and Enhanced Grout**

| Physical Property | Requirement | Test Method |
|---|---|---|
| **Water-Cementitious Material Ratio** | Maximum 0.45 | n/a |
| **Setting Time** | Minimum 3 hours<br>Maximum 12 hours | ASTM C953 |
| **Grout Cube Strength** | Min. 3,000 psi at 7 days<br>Min. 5,000 psi at 28 days | ASTM C942 |
| **Pumpability and Fluidity for Non-Thixotropic Grouts (Flow Cone Efflux Time)** | Immediately after mixing:<br>Min. 20 sec., Max. 30 sec.<br>After letting stand for 30 min. and remixing for 30 sec.:<br>Max. 30 sec. | ASTM C939 |
| **Control of Bleed (Wick Induced Bleed Test)** | Max. 0% bleed after 3 hours | Modified ASTM C940* |

*The modified version of ASTM C940 is described in the PTI "Guide Specification for Grouting of Post-Tensioned Structures", February 2001.

**Table 2 - Additional Physical Property Requirements for Enhanced Grout**

| Physical Property | Requirement | Test Method |
|---|---|---|
| **Permeability** | ≤ 2,500 Coulombs after 6 hours** | ASTM C1202** |
| **Volume Change** | Vertical height change of cylinder:<br>0.0% to 0.3% at 24 hours<br>Less than 0.3% at 28 days | ASTM C1090 |
| **Pumpability and Fluidity for Thixotropic Grouts (Modified Flow Cone Efflux Time for 1 Liter Discharge***)** | Immediately after mixing:<br>Min. 9 sec., Max. 20 sec.<br>After letting stand for 30 min. and remixing for 30 sec.:<br>Max. 30 sec. | Modified ASTM C939*** |
| **Control of Bleed (Gelman Pressure Test)** | See Table 2A**** | Pressure Bleed Test**** |

** When evaluating grouts, the ASTM C1202 procedure shall be modified to perform the test at 30 volts rather than 60 volts. Testing shall be performed on grout samples at 28 days of age. For grouts containing pozzolanic mineral admixtures, testing may be performed on grout samples at 90 days of age.

*** Grouts containing anti-bleed admixtures or silica fume may have thixotropic characteristics. For Enhanced Grouts with thixotropic properties, the modified flow cone efflux time shall be measured, and the pumpability and fluidity requirements of Table 2 shall supercede those of Table 1. The modified version of C939 involves filling the flow cone to the top instead of the standard level, and the efflux time is measured as the time to fill a 1-liter container placed directly under the flow cone. If an Enhanced Grout does not have thixotropic properties, the pumpability and fluidity requirements of Table 1 shall apply.

**** The Pressure Bleed Test using Gelman Filter Funnel is described in the PTI "Guide Specification for Grouting of Post-Tensioned Structures", February, 2001. The pressure to be used during the test is a function of the maximum expected vertical rise in the tendon under consideration, as indicated in Table 2A.

**Table 2A – Bleed Under Pressure Limits for Enhanced Grouts**

| Maximum Vertical Rise Along Tendon, x | Gelman Pressure | Bleed After 10 min. (% of sample volume) |
|---|---|---|
| 0 ft ≤ x ≤ 2 ft | 20 psi | 4% |
| 2 ft < x ≤ 6 ft | 30 psi | 2% |
| 6 ft < x ≤ 100 ft | 50 psi | 0% |

**5. Grout Testing During Grouting Operations.** Acceptance testing for grout physical properties shall be performed during grouting operations as provided below.

In order to qualify, **Normal Grout** shall have the physical properties listed in Table 3 when mixed, prepared and tested on-site during grouting operations.

In order to qualify, **Enhanced Grout** shall have the physical properties listed in Table 4 when mixed, prepared and tested on-site during grouting operations.

In order to qualify, **Commercial Prepackaged Grout** that has previously met the requirements of this Specification (Materials Section K.4) as independently certified by a Laboratory approved by the Engineer, shall have the physical properties listed in Table 5 when mixed, prepared and tested on-site during grouting operations.

For large projects with extensive grouting requirements, the frequency of testing listed in Tables 3, 4 and 5 may be reduced at the discretion of the Engineer.

**Table 3 – Acceptance Testing Requirements for Normal Grout**

| Physical Property | Frequency of Testing* | Requirement | Test Method |
|---|---|---|---|
| **Grout Cube Strength** | One strength test per 2 cubic yards of grout | Min. 3,000 psi at 7 days<br>Min. 5,000 psi at 28 days | ASTM C942 |
| **Pumpability and Fluidity (Flow Cone Efflux Time)** | For each 2 cubic yards of grout or every 2 hours of grouting:<br>One (1) test after mixing and before injection,<br>One (1) test on grout collected at duct outlet | Immediately after mixing: Min. 20 sec., Max. 30 sec.<br>After collection at duct outlet:<br>Max. 30 sec. | ASTM C939 |

* Each test shall be performed at least once per grouting operation.

**Table 4 – Acceptance Testing Requirements for Enhanced Grout**

| Physical Property | Frequency of Testing* | Requirement | Test Method |
|---|---|---|---|
| **Grout Cube Strength** | One strength test per 2 cubic yards of grout | Min. 3,000 psi at 7 days<br>Min. 5,000 psi at 28 days | ASTM C942 |
| **Pumpability and Fluidity** | For each 2 cubic yards of grout or every 2 hours of grouting:<br>One (1) test after mixing and before injection, and One (1) test on grout collected at duct outlet | Non-Thixotropic Grouts<br>Flow Cone Efflux Time:<br>1) Immediately after mixing: Min. 20 sec., Max. 30 sec.<br>2) After collection at duct outlet: Max. 30 sec.<br><br>Thixotropic Grouts**<br>Modified Flow Cone Efflux Time:<br>1) Immediately after mixing: Min. 9 sec., Max. 20 sec.<br>2) After collection at duct outlet: Max. 30 sec. | ASTM C939<br><br>Modified ASTM C939** |
| **Volume Change (Vertical height change of cylinder)** | One test per 2 cubic yards of grout | 0.0% to 0.3% at 24 hours<br>Less than 0.3% at 28 days | ASTM C1090 |
| **Control of Bleed (Gelman Pressure Test)** | One test per 2 cubic yards of grout, sample taken at mixer | See Table 2A*** | Pressure Bleed Test*** |

* Each test shall be performed at least once per grouting operation.

** Grouts containing anti-bleed admixtures or silica fume may have thixotropic characteristics. The modified version of ASTM C939 involves filling the flow cone to the top instead of the standard level, and the efflux time is measured as the time to fill a 1 liter container placed directly under the flow cone.

*** The Pressure Bleed Test using Gelman Filter Funnel is described in the PTI "Guide Specification for the Grouting of Post-Tensioned Structures", February, 2001. The pressure to be used during the test is a function of the maximum expected vertical rise in the tendon under consideration, as indicated in Table 2A.

## Table 5 – Acceptance Testing Requirements for Approved Prepackaged Grout

| Physical Property | Frequency of Testing* | Requirement | Test Method |
|---|---|---|---|
| **Pumpability and Fluidity** | For each 2 cubic yards of grout or every 2 hours of grouting:<br>One (1) test after mixing and before injection, and One (1) test on grout collected at duct outlet | Non-Thixotropic Grouts<br>Flow Cone Efflux Time:<br>1) Immediately after mixing: Min. 20 sec., Max. 30 sec.<br>2) After collection at duct outlet: Max. 30 sec.<br><br>Thixotropic Grouts**<br>Modified Flow Cone Efflux Time:<br>1) Immediately after mixing: Min. 9 sec., Max. 20 sec.<br>2) After collection at duct outlet: Max. 30 sec. | ASTM C939<br><br>Modified ASTM C939** |

* Each test shall be performed at least once per grouting operation.

** Grouts containing anti-bleed admixtures or silica fume may have thixotropic characteristics. The modified version of ASTM C939 involves filling the flow cone to the top instead of the standard level, and the efflux time is measured as the time to fill a 1-liter container placed directly under the flow cone.

## CONSTRUCTION REQUIREMENTS

**524.03 Construction Requirements.**

**A. Protection of Prestressing Steel.**

**1. Before Installation of Tendons in ducts.** All prestressing steel shall be protected against physical damage at all times from manufacture to grouting or encasing in concrete. Prestressing steel that has sustained physical damage at any time shall be rejected. Any reel that is found to contain broken wires shall be rejected and the reel replaced.

Prestressing steel shall be packaged in containers or shipping forms for protection of the steel against physical damage and corrosion during shipping and storage. A corrosion inhibitor, which prevents rust or other results of corrosion, shall be placed in the package or form, or shall be incorporated in a corrosion inhibitor carrier type packaging material, or when permitted by the engineer, a corrosion inhibitor may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or concrete or bond strength of steel to concrete. Inhibitor carrier type packaging material shall conform to the provisions of Federal Specifications MIL-P-3420. Packaging or forms damaged from any cause shall be immediately replaced or restored to original condition.

The prestressing steel shall be stored in a manner which will at all times prevent the packing material from becoming saturated with water and allow a free flow of air around the packages. If the useful life of the corrosion inhibitor in the package expires, it shall immediately be rejuvenated or replaced.

At the time the prestressing steel is installed in the work, it shall be free from loose rust, loose mill scale, dirt, paint, oil, grease or other deleterious material. Removal of tightly adhering rust or mill scale will not be required. Prestressing steel that has experienced rusting to the extent it exhibits pits visible to the naked eye shall not be used in the work.

The shipping package or form shall be clearly marked with the heat number and with a statement that the package contains high-strength prestressing steel, and care is to be used in handling. The type and amount of corrosion inhibitor used, the date when placed, safety orders and instructions for use shall also be marked on the package or form.

**2. After Installation of Tendons in Ducts.** The prestressing steel shall be protected from corrosion and the duct system shall be sealed to prevent moisture intrusion from the time of tendon installation to the time of grouting, as provided below.

As discussed in Construction Requirements Sections B.1 and B.4, the ends of ducts and anchorages and all duct connections shall be sealed at all times following installation in the forms to prevent entry of moisture and debris. In addition, all grout ports and vents shall be closed or plugged at all times during the period prior to grouting.

Grouting shall proceed as soon as possible after installation and stressing of the tendons. The time from installing the tendons in an unstressed condition to grouting after stressing shall not exceed the following without approval of the Engineer:

| | |
|---|---|
| Very damp atmosphere (RH > 70%) or over salt water | 7 days |
| Moderate to dry atmosphere (RH < 70%) | 10 days |

**a. Tendon Protection Between Installation and Stressing.** Measures shall be taken to protect the prestressing steel when there is a period of more than 24 hours between installation of the tendons in ducts and stressing. Bare strand projecting out of the duct shall be wrapped continuously in plastic sheeting and sealed using waterproof tape. The plastic wrap shall extend to the tendon anchorage, and the anchorage opening shall be sealed with plastic and waterproof tape sufficient to prevent moisture intrusion. All grout ports and vents shall be closed or plugged, and all duct connections shall be sealed.

**b.** **Tendon Protection During Staged or Segmental Construction.** When plans provide for the tendons to be installed in one unit or segment, either longitudinally, transversely or vertically, with a length of bare strand left projecting for purposes of threading into another unit or segment during later erection operations, the provisions described in Construction Requirements Section A.2a shall apply. All of the prestressing steel shall be protected immediately after it is first installed in the first unit or segment until the tendon is grouted in the second unit or segment.

**c.** **Tendon Protection Between Stressing and Grouting.** Anchorages should be capped or otherwise sealed again immediately following stressing and cutting of strand tails.

In aggressive exposures where permanent end anchorage protection caps are to be used, the time period between stressing and installation of the permanent end caps shall not exceed 12 hours without approval of the Engineer.

In non-aggressive exposures, permanent grout caps may or may not be in use. If permanent grout caps are to be used, grout caps shall be installed within 48 hours of stressing. If permanent grout caps are not used, the end anchorage region of the tendon shall be sealed against moisture intrusion using plastic sheeting and waterproof tape within 48 hours of stressing.

In all cases, tendons and ducts shall be thoroughly blown dry with oil-free compressed air immediately prior to sealing or capping of the anchorages. In addition, all grout ports and vents shall remain plugged, sealed or otherwise capped, and all duct connections shall be sealed.

**d.** **Use of Temporary Corrosion Inhibitors.** The use of corrosion inhibitors such as vapor phase inhibitors or water-soluble oils for temporary corrosion protection is not permitted without prior approval of the Engineer.

**B. Installation of Ducts, Grout Injection Ports and Outlet Vents.**

**1.** **Ducts.** Ducts shall be securely tied in position, carefully inspected and repaired before placing of the concrete is started. Care shall be exercised during placement of the concrete to avoid displacing or damaging the ducts. Internal ducts shall be supported at intervals necessary to prevent deflection and or displacement, not to exceed four feet. The Contractor, at no expense to the Engineer, shall supply any additional mild reinforcing required to support post-tensioning ducts. The tolerance on the location of the tendons shall be plus or minus 1/4-inch at any point. After installation in the forms, the ends of ducts shall at all times be sealed to prevent entry of water and debris.

**2.** **Grout Inlets and Outlets.** Pipes, as specified in the Materials Section F, shall be installed on each duct to serve as injection or vent ports during grouting. These shall be at locations shown on the Contract Plans or approved Shop Drawings and in accordance with the following:

- Inlets (Grout Injection Ports) shall be provided for injecting grout into the duct.
- Outlets (Grout Exit Vents) shall allow the escape of air, water, grout, and bleed water. The inner diameter of inlets and outlets shall be at least 3/4 in. for strand tendons and 3/8 in. for single bar tendons.
- Inlets and Outlets shall be of flexible HDPE or HDPP pipe.

The length of an inlet port or outlet vent shall extend sufficiently out of the concrete to allow for proper closing. At all high points the outlet shall connect at the uppermost part of the duct profile.

Inlets and Outlets shall be placed at locations shown on the Contract Plans, on the Approved Shop Drawings, and on the approved Grouting Operation Plan (below). Locations shall be as follows:

a. At the top of each tendon anchorage and top of grout cap.
b. At each high point of the duct profile when the vertical distance between the highest and lowest point is more than 20".
c. An outlet at each low point of the tendon.
d. An inlet at the lowest point of the tendon. Judgment should be used in locating the lowest point. For example, if the absolute low point is in a deviation block

for an external tendon, then place the inlet close to the block in the accessible portion of the duct.

e. At all low points the inlet/outlet shall be free draining.

f. At major changes in the cross section of the duct, such as couplers and anchorages.

g. At each side of couplers.

h. At a distance of approximately 3 ft. from each high point in the direction of grout flow.

i. For external tendons, provide vents as close to the inside face of the diaphragm as practical, located on the top of the duct.

j. At other locations recommended by the Engineer.

All connections to ducts shall be made with metallic or plastic structural fasteners. Waterproof tape shall be used at all connections including vent and grouting pipes, except where otherwise specified herein. Vents shall be mortar tight, taped as necessary, and shall provide means for injection of grout through the vents and for sealing the vents.

All inlet and outlets shall be permanently sealed to prevent water infiltration to the grouted tendon. Sealing details are to be submitted for approval to the Engineer.

All grout injection and vent pipes shall be fitted with positive mechanical shut-off valves. Vents and injection pipes shall be fitted with valves, caps or other devices capable of withstanding the pumping pressures.

**3. Standpipes for Vertical Tendons.** For all vertical tendons, which have strands as the prestressing steel, a standpipe shall be provided at the upper end of the tendon to store bleed water and allow it to be reabsorbed by the grout. This device shall be designed so that the level of the grout can be brought to an elevation which will assure that bleeding or subsidence will at no time cause the level of the grout to drop below the highest point of the upper anchorage device. It will also be designed so that as bleed water migrates to the top; grout is able to migrate downward to replace it. Provision shall be made to assure that bleed water rises into the standpipe, and does not form and remain in the uppermost part of the tendon and anchorage device.

**4. Care and Protection of Ducts, Vents, Anchorages and Blockouts.** Care shall be taken to ensure that all ducts, anchorages, blockouts, openings and vents are kept clean and free of debris, fuel, oils, other contaminants and site trash at all times prior to and after installing the tendons. Temporary plugs, seals and covers shall be used. Minor damage to ducts may be repaired by removing the local damage and splicing duct or couplers onto the intact section (prior to the placing of concrete). Repair of major duct damage requires the removal and replacement of the entire duct section.

Connections from grout hose to inlet and ejection ports and to vents shall be kept free from dirt and are airtight.

**5. Pre-Grouting Air Pressure Test of Duct System.** Following assembly of the complete duct system, including installation of all ducts, grout inlets and outlets, couplers and connections, and immediately prior to placement of the prestressing tendon or after stressing of the tendon, an air pressure test shall be performed on each complete duct system.

The air pressure test shall involve pressurizing the complete duct system with dry, oil-free air to 1.5 psi, and monitoring the pressure in the system for a period of 5 minutes. If the pressure loss during this 5-minute period exceeds 10%, all sources of leakage shall be identified, and measures shall be taken to reduce or eliminate the identified leaks such that upon repeating the pressure test the pressure loss is limited to less than 10% in 5 minutes.

The operation of each vent shall be tested by blowing dry, oil free air into the duct system and opening and closing each vent in turn.

**C. Post-Tensioning Operations.**

**1. General.**

**a. Concrete strength:** post-tensioning shall only be applied when the concrete has attained the required compressive strength as determined from test cylinders cured under the same conditions as the structural concrete.

The design of the structure is based on the assumed friction and wobble coefficient shown in the plans.

The post-tensioning forces shown are theoretical and do not include losses in the system or thermal effects.

**b.** **Stressing Tendons:** All post-tensioning shall be tensioned by means of hydraulic jacks so that the force of the prestressing steel shall not be less than the value shown on the Contract Plans or Approved Shop Drawings or as otherwise approved by the Engineer. Monostrand stressing shall not be used for tendons with 5 or more strands unless approved by the Engineer.

**c.** **Maximum Stress at Jacking:** The maximum temporary tensile stress (jacking stress) in prestressing steel shall not exceed 80 percent of the specific minimum ultimate tensile strength of the prestressing steel. Tendons shall not be overstressed to achieve elongation.

**d.** **Initial and Permanent Stress:** The prestressing steel shall be anchored at initial stresses in a way that will result in the ultimate retention of permanent forces of not less than those shown on the Contract Plans or the Approved Shop Drawings, but in no case shall the initial stress, after anchor set, exceed 70 percent of the specified minimum ultimate tensile strength of the prestressing steel.

Permanent force and permanent stress are the force and stress remaining in the prestressing steel after all losses, including creep and shrinkage of concrete, elastic shortening of concrete, relaxation of steel, thermal affect, losses in post-tensioned prestressing steel due to sequence of stressing friction and take-up of anchorages, and all other losses peculiar to the method or system of prestressing have taken place or have been provided for in an approved stressing plan.

**e.** **Excessive Friction:** When friction must be reduced, water-soluble oil or graphite with no corrosive agents may be used as a lubricant subject to the approval of the Engineer. Lubricants shall be flushed from the duct as soon as possible after stressing is completed by use of water pressure. These ducts shall be flushed again just prior to the grouting operations. Each time the ducts are flushed, they shall be immediately and thoroughly blown dry with oil-free air.

**2.** **Stressing Jacks.**

**a.** **Stressing Equipment:** Each jack shall be equipped with a pressure gauge having an accurate reading dial at least six inches in diameter for determining the jack pressure.

**b.** **Calibration:** Prior to use for stressing on the project, each jack and its gauge shall be calibrated as a unit. Initial calibration shall be done, using a proven load cell, at an independent testing laboratory, approved by the Engineer.

Calibration shall be done with the cylinder extension approximately in the position that it will be when applying the final jacking force and with the jacking assembly in an identical configuration to that which will be used at the job site (i.e. same length hydraulic lines). Certified calibration calculations and a calibration chart, both in English units of measure, shall be furnished to the Engineer for each jack and gauge unit.

Recalibration of each jack shall be done at six month intervals and at other times when requested by the Engineer. At the option of the Contractor, calibrations subsequent to the initial laboratory calibration may be accomplished by the use of a master gauge. The master gauge shall be calibrated at the same time as the initial calibration of the jacks, and shall be part of the unit for each jack. The data recorded during the initial calibrations shall be furnished to the Engineer for use in the field. The master gauge shall be supplied by the Contractor in a protective waterproof container capable of protecting the calibration of the master gauge during shipment. The contractor shall provide a quick-attach coupler next to the permanent gauge in the hydraulic lines, which enables the quick and easy installation of the master gauge to verify the permanent gauge readings. The master gauge shall remain in the possession of

the Engineer for the duration of the project. If a jack is repaired or modified, including replacing the seals or changing the length of the hydraulic lines, the approved testing laboratory shall recalibrate the jack. No extra compensation will be allowed for the initial or subsequent jack calibrations or for the use and required calibration of a master gauge.

**3. Stressing of Tendons.** Post-tensioning forces shall not be applied until the concrete has attained the specified compressive strength as evidenced by tests on representative samples of the concrete. These samples shall be stored under the same conditions as the concrete in order to accurately represent the curing condition of the concrete in place.

The tensioning process shall be so conducted that tension being applied and the elongation of the post-tensioning steel may be measured at all times. A permanent record shall be kept of gauge pressures and elongations at all times and shall be submitted to the Engineer. The post-tensioning force may be verified as deemed necessary by the Engineer.

For all tendons, excluding post-tensioning bars with lengths less than 20 feet, the tendon force measured by gauge pressure shall agree within seven percent of the theoretical elongation or the entire operation shall be checked and the source of error determined and remedied to the satisfaction of the Engineer before proceeding with the work. Elongations shall be measured to the nearest 1/16-inch. In determining why the measured tendon force and the theoretical elongation do not agree within seven percent, the Contractor may elect to establish that the apparent modulus of elasticity of the post-tensioning steel varies from the value shown in the general notes to the plans by conducting a bench test on a full size tendon in accordance with a procedure furnished by the Engineer. This test may be performed at a site remote from the project provided that the Contractor pays the cost to the Engineer of sending a representative to witness the test. Equipment for tensioning the tendons must be furnished by the manufacturer of the system. Should agreement between pressure gauge readings and measured elongations fall outside the acceptable tolerances, the Engineer may require without additional compensation to the Contractor, additional in-place friction tests in accordance with the Materials Section J.2.

The anchor force for all permanent post-tensioning bars with lengths less than 20 feet shall be verified with a lift-off after initial stressing operations. The resulting lift-off shall be within ±5% of the expected final anchor force as specified in the plans.

Multi-strand post-tensioning tendons having wires that have failed by breaking or slippage during stressing may be accepted providing that:

a. The completed structure must have a final post-tensioning force of at least 98% of the design total post-tensioning force at the affected sections.

b. At any stage of erection, the post-tensioning force across a mating surface must be at least 98% of the force required for that stage.

c. Any single tendon must have no more than 5% reduction in cross-sectional area of the post-tensioned steel.

If these conditions cannot be met, then the affected tendon(s) shall be removed and replaced. Previously tensioned strands shall not be re-used unless approved by the Engineer. Any of these conditions may be waived by the Engineer when the Contractor is able to propose an acceptable means of restoring the post-tensioning force lost due to wire failure or slippage.

Post-tensioning bars used to apply temporary post-tensioning may be reused as temporary bars if they are undamaged.

An abrasive saw shall be used to cut prestressing steel within 3/4 to 1 1/2 inches away from the anchoring device. Flame cutting of prestressing steel is not allowed, except for pretensioned prestressing steel or with the specific approval of the Engineer.

**D. Grouting.**

**1. General.** After post-tensioning and anchoring of a tendon has been completed and accepted, the annular space between the prestressing steel and the duct shall be grouted in accordance with this Specification. The interval between post-tensioning and grouting shall be limited as specified in Construction Requirements Section A.2. Immediately after post-tensioning, all grout vents, anchorages, and duct connections of each tendon

shall be temporarily sealed to prevent entrance of air and water until just prior to tendon grouting.

At least six weeks before grouting commences, the Contractor shall submit to the Engineer for review and approval a "Grouting Operation Plan". Final written approval of the plan is required before grouting occurs. The Engineer will make a preliminary approval of the plan after review of the written plan and incorporation of any comments by the Engineer have been incorporated and/or addressed by the Contractor. The Engineer will make final approval of the Grouting Operation Plan after the successful completion of the Grouting Mock-Up Test that is described below. Grouting operations shall be under the supervision of a qualified and experienced person, acceptable to the engineer.

The Grouting Operation Plan shall address the following:

a. Names of grouting crew and Supervisor.
b. Experience of crewmembers and Supervisor.
c. Training to be provided or undertaken prior to operations.
d. Type of equipment to be used, including capacity in relation to demand.
e. Working condition of equipment, back-up and spare parts.
f. Types, brands and certifications of materials
g. Identity of independent testing laboratory for certification of materials.
h. Production of grout fluidity, on-site flow testing, adjustments and controls.
i. Estimate of grout required per tendon or group of tendons
j. Method of controlling rate of flow and filling of ducts
k. Locations, types and sizes of inlet and outlet vents
l. Means of sealing and protecting tendons and ducts prior to grouting
m. Grout mixing and pumping procedures
n. Tendon or groups of tendons to be grouted in one operation.
o. Direction of grouting and sequence of using inlets and closing vents.
p. Procedures for handling blockages, including flushing of ducts.
q. Procedures for possible re-grouting to detect and fill voids.
r. Procedures for controlling w/c ratio and ensuring that the water used is acceptable.
s. Contractor's QC forms that are to be signed daily by Grout Supervisor.

Before grouting operations commence, a joint meeting shall be held with the Contractor, Grouting Crew, Engineer, and Engineering Inspection Team to discuss and understand the grouting operation plan, required testing and corrective procedures.

After the Contractor's Grouting Plan is given preliminary approval by the Engineer and before grouting commences, the Contractor will be required to perform a Mock-Up Test. The purpose of this test is to verify that the materials and procedures proposed will properly grout the tendons. It will also serve as training for the grouting personnel on site. The test will be conducted at the project site.

The Mock-Up Test will consist of grouting an external tendon in a clear duct with a duct profile as indicated below. The Contractor must use the same equipment, materials, connections, and procedures that are in the Approved Grouting Plan.

The Test Specimen must be at least 150' in length with a vertical rise at one end of 6' and a vertical rise of 10' on the other end. The tendon will be divided into thirds with a 50' length for the first rise, a 50' length for a straight portion, and a 50' length the last portion. These requirements for the test specimen are shown in the detail below.

The duct material must be see-through and at least 3" in diameter. Inside the duct, there shall be a seven-strand tendon consisting of normal P.T. strand. It is not necessary that the P.T. strand be stressed. If the Contractor thinks stressing of the tendon or other modifications are required to the grout mock-up to demonstrate the success of the Contractors grouting operations, these modifications shall be submitted to the Engineer for review and approval. Modifications will be considered, but must be at no additional cost to the Engineer.

The Contractor will submit for approval the test set-up including materials, geometrics, procedures to be followed and the anticipated amount of bleed water for this specimen.

The test will be considered successful if all 3 of the following conditions are satisfied:

(1) The methods and materials in the approved grouting plan can completely grout the tendon

(2) There are no air voids over 0.5" in diameter in the inclined length after the grout has hardened

(3) There is not excessive bleed water at either end over the anticipated amount.

If the test is run and not considered to be successful by the Engineer then the Contractor must resubmit his Test Plan procedures to remedy the deficiencies noted by the Engineer. The Contractor must have a successful Mock Up Test completed before post-tensioning operations including stressing can begin.

The cost of all labor, materials and incidental items required to perform this Grouting Mock-Up Test shall be incidental to the cost of the prestressing system.

**2. Grouting Personnel Qualifications.** All grouting operations shall be carried out by workers trained for the tasks required, and having at least 3 years experience on previously successful projects of similar type and magnitude.

Grouting shall be performed under the immediate control of a person skilled in the various aspects of grouting, and having experience on at least four previous and satisfactorily completed projects of a similar size and scope. This person shall be named and shall furnish proof of experience as required by the Engineer.

Grouting Supervisors must have ASBI Grouting Certification and/or previous experience on satisfactorily completed projects of a similar size and scope.

**3. Equipment.**

**a. General:** Grouting equipment consists of measuring devices for water and admixtures, a mixer, a storage hopper, and a pump with all the necessary connecting hoses, valve, pressure gauges, and test equipment. Accessory equipment shall provide for accurate solid and liquid measures of all materials to be batched.

The equipment shall have sufficient capacity to ensure that the post-tensioning duct or group of ducts to be grouted can be filled and vented without interruption at the required rate of injection. Under normal conditions, the equipment shall be capable of continuously grouting the longest tendon (or group of tendons) on the project in 30 minutes.

**b. Mixer:** The mixer shall be capable of continuous mechanical mixing. It shall produce a homogeneous and stable grout free of lumps and undispersed solids (cement or grout mix) and shall be able to deliver a continuous supply of grout to the pumping equipment. (A colloidal mixer is preferred).

There shall be a gravity feed to the pump inlet from the mixer and/or hopper attached to and directly over it. An additional storage hopper may be incorporated between the mixer and the pump. It shall be fitted with an agitator to keep the grout moving continuously before it is pumped into the duct. The storage hopper shall be kept partially full at all times to prevent air from being drawn into the duct.

The grouting equipment shall contain a screen having clear openings of 1/8 inch maximum size to screen incompletely mixed lumps from the grout prior to its introduction into the grout pump or storage hopper. If the grout contains a thixotropic admixture, a screen opening of 3/16 inch will be satisfactory. The screen shall be located between the mixer and the pump, or when a storage hopper is used, between the mixer and the storage hopper. This screen shall be easily accessible for inspection and cleaning.

**c. Injection equipment:** Grout pumps shall be capable of pumping the grout in a continuous operation with little variation of pressure and shall include a system for re-circulating grout when injection is not in progress. The equipment shall be capable of maintaining a pressure on completely grouted ducts and shall be fitted with a valve that can be locked-off without loss of pressure in the duct. The use of compressed air for pumping grout shall not be allowed.

Grout pumps shall be a positive displacement type capable of producing an outlet pressure of not less than 145 psi and shall have seals

adequate to prevent introduction of oil, air or other foreign substance into the grout and to prevent loss of grout or water.

A pressure gauge having a full-scale reading of no greater than 290 psi shall be placed at some point in the grout line between the pumping outlet and the duct inlet.

All piping to the pump shall have a minimum number of bends, valves and changes in diameter and shall incorporate a sampling tee. The diameter and rated pressure capacity of the hoses must be compatible with the pump output, the assumed maximum pressure and the length needed. Grout hoses shall be firmly connected to pump outlets, pipes and inlets of the duct.

**d.** **Stand-by Equipment:** During grouting operations, provide adequate flushing equipment to facilitate complete removal of the grout in the event of a breakdown of the grouting equipment or other disruption before the grouting operation has been completed. This equipment shall be kept in working order. Where potable water is unavailable, a tank of sufficient water will be required.

**e.** **Equipment for Thixotropic Grout:** The following additional equipment shall be used. The grout equipment shall have two identical charging/holding tank units. Each unit alternates between duties either as a blender or holding tank. The tank units shall have a high-shear (colloidal) mixer and pump and the placing pump shall have exact pressure control capabilities, and be fed from the holding tank. In addition, a pressure filter type grout test kit is required.

**4.** **Mixing Grout.** The sequence for charging the mixer shall be: first add water, start mixer and add cement. When cement and water are reasonably well mixed, admixtures shall be introduced in accordance with the written instructions of the manufacturer of each admixture. The mixing procedures shall prevent admixture from getting caught on the blades or sides of the drum and from forming gel globules. The mixing procedure may be varied in accordance with the written recommendations of the manufacturer of the admixtures.

The grout shall be mixed until a uniformly blended mixture is obtained and shall be continuously agitated until it is introduced into the grout pump. Batches of grout shall be placed within 30 minutes of mixing. No water shall be added to the grout to modify its consistency after the initial mixing operation is completed.

**5.** **Cleaning and Flushing Tendons.** Tendons <u>shall not</u> be flushed with water except in situations where a water soluble lubricant is applied to the prestressing steel, as described in Construction Requirements Section C.1e, or as otherwise permitted or directed by the Engineer.

If flushing is to be performed as required in Construction Requirements Section C.1e or as directed by the Engineer, the inside of the duct system shall be flushed with water (under pressure) meeting the quality requirements of Materials Section K.3c to remove all traces of the lubricant (or other contaminant). Following the flushing operation, water shall be totally drained from within the duct system and it shall be blown out with compressed oil-free air to the extent necessary to dry the prestressing steel and inside surfaces of the ducts. The waste fluid flushed from the duct system shall be captured and disposed of properly.

**6.** **Injecting Grout.**

**a.** **General Grouting Procedures.** Grouting shall start at the lowest injection port will all vents holes open. A continuous one-way flow of grout shall be maintained at all times.

The maximum rate of grout injection shall be 16 ft per minute for vertical ducts and 50 ft per minute for horizontal ducts.

Grout shall be pumped through the duct and flow continuously at the first vent hole after the injection port until no visible slugs or other evidence of air or water are ejected and the grout being ejected has the same consistency as the grout being injected. At this time, at least one gallon of grout for tendon sizes 7-0.6” and smaller and 3 gallons of grout for tendon sizes 9-0.6” and larger shall be vented from the first vent hole into a suitable receptacle and discarded properly. The first vent valve shall then be closed. Grout injection shall continue until all vents have been closed one after another in the direction of

flow following the same process. At intermediate crests where vents have been provided both at the crest and immediately downstream from the crest, the vent downstream of the crest shall be closed before the associated crest vent.

When the tendon duct is completely filled with grout and after the last outlet vent has been closed, the injection port shall be closed immediately following stoppage of the grout pump.

When a one-way flow of grout cannot be maintained, or when grouting is interrupted, the grout shall be immediately flushed out of the duct with water. A water pump shall be available on-site for this purpose as part of the standard flushing equipment. The flushing pressure shall not exceed the grouting pressures listed in Construction Requirements Section D.6b below.

**b. Grouting Pressure.** The pumping pressure at the tendon inlet shall not exceed the following:

| | |
|---|---|
| External tendons of HDPE pipe | 145 psi |
| Internal PE ducts | 145 psi |
| Internal flat or oval steel ducts | 145 psi |
| Internal circular steel ducts | 250 psi |

However, normal operations shall be performed at approximately 75 psi.

If the actual grouting pressure exceeds the maximum permitted pumping pressure, the inlet shall be closed and grouting shall continue at any vent hole that has been or is ready to be closed as long as a one-way flow of grout is maintained. Grout shall not be injected into a succeeding outlet from which grout has not yet flowed. Any such outlet used for injection shall be fitted with a positive shut-off.

**c. Vertical Grouting.** All vertical tendons that have strands as the prestressing steel shall be fitted with a standpipe as specified in the Construction Requirements. As grouting is completed, the standpipe shall be filled with grout to a level, which will assure that, as settlement of grout occurs, the level of grout will not drop below the highest point in the upper anchorage device. If the level of grout drops below the level of the highest point in the anchorage device, additional grout shall immediately be added to the standpipe. After the bleed water is absorbed and the grout has hardened, the standpipe shall be removed.

For long, vertical internal tendons, if the grouting pressure exceeds the maximum permitted pumping pressure specified in Construction Requirements Section D.6b, then the grout shall be injected at increasingly higher vents (which become injection locations), which have been or are ready to be closed as long as a one-way flow of grout is maintained.

For external vertical tendons, lifts of grout shall not exceed 30 feet until the lower lift has set without approval of the Engineer. Two steel band clamps shall be securely fastened around the external duct at the top of the lower lift. Injection shall proceed from a point just above the top of the lower lift.

Only grout with zero bleed properties per Tables 1 and 2A shall be used for any vertical tendon longer than 15 feet.

**d. Temperature Considerations.** When it is anticipated that the air temperature will fall below 32°F, ducts shall be kept free of water so as to avoid freeze damage to ducts. No grouting shall be done when the temperature of the grout is below 45°F. The temperature of the concrete and air surrounding the tendon shall be maintained at 35°F or above from the time grout is placed until the compressive strength of the grout, as determined from tests on two-inch cubes cured under the same conditions as the in-place grout, exceeds 800 psi.

Under hot weather conditions, grouting shall take place early in the morning when daily temperatures are lowest. No grouting shall be done when the temperature of the grout exceeds 90°F. It may be necessary to chill mixing water or take special measures to lower the grout temperature.

**e. Post-Grouting Measures at Injection and Vent Ports.** Grouting vents at high points shall be reopened 10 minutes after completion of grouting and any escape of air, water or grout recorded.

Within approximately 30 minutes of grouting and before the grout has hardened, all opened vents shall be checked for voids. At locations where voids are observed, grout shall be topped off through the outlet, or a re-grouting operation shall be performed using an injection port and outlet vent.

Not less than 48 hours after the completion of grouting, the level of grout at all injection port and outlet vent locations shall be inspected and topped up as necessary with freshly mixed grout. This process will continue until the inspection agency is assured that there are no bleed water or subsidence voids. Subsequent spot inspections may be conducted on one or more selected anchorages per span as long as no voids are found. If voids are found then all tendons will be checked for voids until the inspection agency is assured that the voids are not occurring.

**f. --Post-Grouting Inspection of Anchorages.** Not less than 48 hours after the completion of grouting, all end anchorages shall be inspected for the presence of voids behind the anchorage.

The grout injection port on the anchorage shall be drilled out or otherwise cleaned of grout to allow the inspection of potential voids immediately behind the anchorage or within the trumpet region of the tendon. Care shall be taken during the drilling process to ensure that the drilling operation does not come into contact with the strands or bar(s) of the tendon.

Assessment of the potential void space shall involve physical probing through the grout injection port with a suitable wire or probe, or visual inspection using of a flexible fiberscope or video scope. The presence of a void and an estimation of its extent or length shall be recorded.

All voids identified behind anchorages shall be re-grouted as follows:

(1) Re-grouting shall involve insertion of a grout tube through the grout injection port into the void space, and filling of the void with freshly mixed grout meeting the requirements of Materials Section K.4.

(2) Grout tube shall be a flexible plastic of sufficient rigidity to allow grouting under pressure without excessive bulging or rupture. The size of the grout tube shall be 0.5 inch maximum O.D.

(3) Grout material shall be placed by pumping the material at low pressures (<100 psi). Pressure shall be sufficiently low to prevent segregation and bleeding of the grout.

(4) Grout tube shall be inserted into the trumpet as far as possible. Tube shall remain within the trumpet and immersed within the grout at all times during the grouting operation except as specified.

(5) The tendon anchorages shall be grouted continuously. No interruptions in grouting will be allowed.

(6) Grouting shall continue until all air, water, or other foreign material is completely purged from trumpet and duct. Grouting shall further continue until an uninterrupted stream of sound, uncontaminated grout flows from the port for a minimum of ten (10) seconds. At this time, the grout tube shall be slowly and continuously removed from the port while grout is still flowing out of the tube under pressure.

(7) Upon completion of grouting, all ports shall be sealed so as to prevent grout leakage until final set of the grout.

Other re-grouting methods, including vacuum grouting, may be used if approved by the Engineer.

**g. Post-Grouting Operations.** Except as specified in Construction Requirements Section D.6e, shut off valves shall not be opened on injection ports or vent ports, nor shall pipes or caps at port locations be removed until the grout has set.

After the grout has set, pipes used as injection or vent ports shall be cut off as described below.

In non-aggressive exposures, metal pipes shall be cut off one inch below the surface of the concrete. Plastic pipes shall be cut off flush with the surface of the concrete.

In aggressive exposures, metal and plastic pipes shall be cut off at least one inch below the surface of the concrete. The resulting recess shall be filled with a non-shrink mortar, and a elastomeric waterproof membrane shall be applied over the repair area. Suitable waterproofing membrane materials include urethane, neoprene or silicone-based elastomers with the following minimum properties:

| | | |
|---|---|---|
| Tensile Strength (ASTM D412) | @ 75°F | 100 psi |
| | @ 0°F | 500 psi |
| Elongation (ASTM D412) | @ 75°F | 500% |
| | @ 0°F | 250% |

All waterproofing materials shall be UV resistant, and shall be approved by the Engineer prior to use.

For vent ports on external tendons, saddles, vent hoses and all other hardware shall be removed and the holes in the ducts shall be sealed using a heat shrink repair sleeve. The heat shrink repair sleeve shall extend a minimum of six inches beyond the vent opening in the duct in both directions. All heat shrink repair materials and procedures shall be approved by the Engineer prior to use.

All miscellaneous material (tie wire, duct tape, etc.) used for sealing grout inlet or vent connections shall be removed prior to carrying out further work to protect end anchorages. End anchorage protection shall be installed as described in Construction Requirements Section D.7.

**7. Protection of Prestress Anchorages.**

a**. Requirements for Aggressive Environments.** For an exposure designated as aggressive, which includes the Route 70 Bridge project, a permanent, non-corroding grout cap shall be used. The permanent grout cap shall completely encapsulate the anchorage wedge plate, and shall attach directly to the anchor plate. A suitable gasket shall be used to prevent moisture intrusion behind the grout cap. Any bolts or fixtures used to secure the permanent grout cap to the anchorage shall have a minimum cover of 1" and shall be of stainless steel or other rust-free material as approved by the Engineer. Additional protection in the form of a block-out shall be utilized, consisting of one coat of epoxy bonding compound, approved non-shrink concrete or mortar to fill the block-out, and an elastomeric waterproofing membrane.

For external anchorages (not recessed) not located at expansion joints or other location where moisture may directly come in contact with the anchorage, additional protection shall consist of an elastomeric waterproofing membrane.

For recessed anchorages, additional protection shall consist of one coat of epoxy bonding compound, approved non-shrink concrete or mortar to fill the anchorage recess, and an elastomeric waterproofing membrane.

Anchorage recesses or block-outs shall be filled as specified in Construction Requirements Section D.7c.

Waterproofing membranes shall be as specified in Construction Requirements Section D.7d.

The permanent grout cap shall remain in place at all times following grouting of the tendon.

**b. Filling of Anchorage Recesses or Block-Outs.** For external (not recessed) anchorages to be encapsulated with a block-out, mild steel reinforcement or stainless steel anchors shall be provided to anchor the block-out concrete or mortar to the segment or structural member. A minimum of two (2) hairpin reinforcing ties (bar size #4 or larger) or a minimum of four (4) stainless steel anchors shall be used for each block-out. Minimum clear cover to all reinforcement or anchors shall be 2 in. Hairpin reinforcement may be installed during segment or member fabrication, or following tendon placement and stressing. In the latter case, all reinforcement shall be dowelled into segment or member concrete a minimum of 4 in. and bonded in-place using an appropriate epoxy adhesive approved by the Engineer. Stainless steel anchors shall be installed in accordance with the manufacturer's recommendations.

Prior to filling of anchorage recesses or block-outs, all exposed end anchorages, strands, grout caps, block-out reinforcement and other metal or non-metal accessories or components shall be cleaned of rust, misplaced mortar, grout and other such materials.

Immediately following cleaning operations, the entire surface of the anchorage recess or area to be covered by the block-out (all metal and concrete) shall be thoroughly dried and uniformly coated with an epoxy bonding compound meeting the requirements of AASHTO Specification M-235, Class III. The epoxy shall be applied in a manner and thickness as recommended by the manufacturer.

Immediately following application of the epoxy-bonding compound, tight fitting forms shall be installed to encase the entire anchorage system, including reinforcement ties or anchors, where applicable. The anchorage recess or block-out shall be completely filled with an approved pea-gravel concrete or non-shrink, cement-based mortar. The concrete or mortar filler shall be placed within the time limits specified by the epoxy bonding compound manufacturer. The filler shall exhibit no shrinkage, and shall contain no aluminum powder, iron particles, chlorides, sulfites, fluorides or nitrates.

c. **Waterproof Membrane.** An elastomeric waterproofing membrane shall be applied at anchorage locations as shown in the plans following finishing and curing of the pour back concrete. Suitable waterproofing membrane materials include urethane, neoprene or silicone-based elastomers with the following minimum properties:

| | | |
|---|---|---|
| Tensile Strength (ASTM D412) | @ 75°F | 100 psi |
| | @ 0°F | 500 psi |
| Elongation (ASTM D412) | @ 75°F | 500% |
| | @ 0°F | 250% |

All waterproofing materials shall be UV resistant, and shall be approved by the Engineer prior to use.

The waterproofing membrane shall completely cover the pour-back concrete used to fill the anchorage recess or block-out, and shall extend for a distance of not less than 12 in. beyond the extent of the pour-back concrete. The membrane shall terminate at a groove cut into the concrete not less than 3/8 in. wide by 3/8 in. deep.

**E. Records of Stressing and Grouting Operations.**

**1. Record of Stressing Operations.** The Contractor shall keep a record of all post-tensioning operations for each tendon installed and stressed. This shall include, but shall not necessarily be limited to the following:

(a) Project name, number
(b) Contractor and/or Sub-Contractor
(c) Tendon location, size and type
(d) Date tendon was first installed in ducts
(e) Coil/reel number for strands or wires and heat number for bars and wire
(f) Assumed and actual cross-sectional area
(g) Assumed and actual modulus of elasticity
(h) Date stressed
(i) Jack and Gauge numbers per end of tendon
(j) Required jacking force
(k) Gauge pressures
(l) Elongations (anticipated and actual)
(m) Anchor sets (anticipated and actual)
(n) Stressing sequence (i.e. tendons before and after this)
(o) Stressing mode (1 end only, 2 ends in sequence, or 2 ends simultaneous)
(p) Witnesses to stressing operation (Contractor and Inspector)
(q) Record of any other relevant information

Within 72 hours, the Contractor shall provide the Engineer with a complete copy of each tendon stressing operation.

2. **Record of Grouting Operations.** The Contractor shall keep a record of all grouting operations for each tendon installed, stressed and grouted. This shall include, but shall not necessarily be limited to the following:

(a) Tendon or group of tendons grouted in one continuous operation
(b) Date grouted
(c) Number of days from stressing to grouting, per tendon
(d) Type of grout mix and additives
(e) Fluidity of grout (flow-cone) per batch for both newly mixed and 30 minute, rested grout
(f) Density of grout per batch of fresh mix
(g) Location of injection port and direction of grout flow (note; injection port may not necessarily be at an end anchorage)
(h) Applied grouting pressure during normal pumping and maximum pressure sustained for one minute after closing all vents grouting
(i) Theoretical volume of grout anticipated to fill duct or ducts
(j) Actual quantity of grout in place in the duct(s) after grouting (For one grout mixing and injection operation, this is the quantity mixed less the quantity wasted at the vents, less the quantity remaining in the mixer and injection equipment)
(k) Summarize any difficulties encountered and corrective action taken
(l) Witnesses to grouting operation (Contractor and Inspector) within 72 hours, the Contractor shall provide the Engineer with a complete copy of all tendon-grouting operations.

## METHOD OF MEASUREMENT

**524.04 Method Of Measurement.**

The quantity of post-tensioning tendons will not be measured and payment will be made for the quantity in the Proposal adjusted for Change Orders except as provided for in Subsection 109.01. No measurement will be made for temporary post-tensioning, which shall be considered included in the item "Post-Tensioning Tendons". Additionally, no measurement will be made for anchorage hardware.

For quantity determination, the following unit weights shall be used:

| Weight per Prestressing System | Unit Length |
|---|---|
| 0.5-inch diameter seven-wire strands | 0.53 lb/ft. |
| 0.6-inch diameter seven-wire strands | 0.74 lb/ft. |
| 1-inch, high strength deformed bar | 3.01 lb/ft. |
| 1-1/4 inch, high strength deformed bar | 4.39 lb/ft. |
| 1-3/8 inch, high strength deformed bar | 5.56 lb/ft. |

## BASIS OF PAYMENT

**524.05 Basis of Payment.**

Unless otherwise specified on the Plans, post-tensioning tendons will be paid for at the contract unit price per pound of steel tendon, complete and in place. Payment shall be full compensation for furnishing, installing, stressing and grouting all temporary and permanent post-tensioning tendons, as follows:

1. Upon installation and accepted stressing of a tendon, 50% payment for that tendon based on the computed weight shall be made.
2. Upon successfully grouting a tendon in accordance with these specifications and submitting the required grouting records, the 40% payment for that tendon based upon the computed weight shall be made.
3. Upon successfully providing the permanent End Anchorage for a tendon, the remaining 10% payment for that tendon based upon the computed weight shall be made.

Payment shall also include anchorage assemblies and post-tensioning system hardware which is not embedded in concrete, grout and grouting, all testing, anchorage protection systems and all labor, materials, tools, equipment and incidentals necessary for completing the work in accordance with these specifications and the Plans.

This payment shall also include lubricants in the tendon ducts for friction control and flushing the lubricant and/or corrosion inhibitor from the tendon ducts after stressing and prior to grouting. No separate measurement and payment will be made for anchorage components, local anchorage zone reinforcement supplied as an integral part of a proprietary anchorage system, nor ducts for similar post-tensioning system hardware.

Anchorage components, ducts and similar items of post-tensioning system hardware which are embedded within precast components or cast-in-place concrete shall be deemed to be included in the cost of the precast components or cast-in-place concrete. Payment shall also include all on-site quality control, testing and records of tendon installation, stressing and grouting operations.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| POST TENSIONING STRAND IN SUBSTRUCTURE, EPOXY COATED | POUNDS |
| POST TENSIONING BAR IN SUBSTRUCTURE | POUNDS |

Permanent post-tensioning strand or bar tendons which are an integral part of individual precast concrete segments shall be measured and paid for under this item and shall not be considered incidental to the cost of those precast concrete segments or units.

Separate payment will not be made for any temporary post-tensioning required. Any cost thereof shall be included in the price bid for the applicable post-tensioning members.

## SECTION 525 – EPOXY JOINING OF PRECAST CONCRETE SEGMENTS

**525.01 General.**

**A. Description.** The work consists of furnishing, mixing and applying a two-component epoxy bonding system to the match cast faces of all joints between precast concrete substructure segments in accordance with the Contract Documents.

The work covered by this section shall also include temporary post-tensioning across a joint, if required, as per Section 524.

This specification covers use of normal setting epoxy bonding agents and slow-setting epoxy bonding agents.

In its workable state, epoxy-bonding agent must provide lubrication along the keys as the precast concrete segments are brought together. In its hardened state, epoxy-bonding agent must provide a watertight seal between precast concrete segments.

### MATERIALS

**525.02 Materials.**

**A. General.** Epoxy bonding agents for match-cast joints between precast segments shall be thermosetting 100 percent solid compositions that do not contain solvent or any non-reactive organic ingredient except for required coloring pigments. Epoxy bonding agents shall be of two components, a resin and a hardener. Both components shall be distinctly pigmented, so that mixing produces a third color similar to the concrete in the segments.

Epoxy bonding agents shall be insensitive to damp conditions during application, and after curing; the epoxy shall exhibit high bonding strength to cured concrete, good water resistance, low creep characteristics and tensile strength greater than the concrete.

Epoxy-bonding agents shall comply with ASTM C-881-99, Types VI and VII, Grade 3

**B. Packaging, Identification and Use.** The components shall be packaged in two parts in sealed containers, pre-proportioned in the proper reacting ratio, ready for combining and mixing in accordance with the manufacturer's instructions. Each container shall bear a label designating the manufacturer's name, the type component (resin or hardener), the range of substrate (surface of concrete) temperature over which application is suitable, the date of formulation, the shelf life of the material and the manufacturer's lot number.

Material from containers that are damaged or have been previously opened shall not be used. Combining of epoxy bonding agent components from bulk supplies will not be permitted. Only full buckets of components will be mixed immediately after opening.

The Manufacturer shall furnish instructions for the safe storage, handling, mixing and application of the material.

**C. Classification of Epoxy Material.** Epoxy bonding agents that remain workable for a short time (about one hour or less) are referred to herein as "normal-set epoxy". Epoxy bonding agents that remain workable over an extended open time (about eight hours) are referred to herein as "slow-set epoxy".

**D.** **Formulation for Temperature Range.** Epoxy bonding agents shall be formulated to provide application temperature ranges that are suitable for erection of segments with substrate temperatures between 40°F and 105°F. There shall be a minimum of two, and preferably three, formulations dividing the overall range into approximately equal sub-ranges that overlap by at least 5°F (3° C).

Additionally, each of these formulations shall be identified as either normal-set or slow-set epoxies as defined by the Contact Time (below).

**E.** **Samples for Testing and Certified Test Reports.** For quality control purposes, for each manufactured lot, the Contractor shall furnish to the Engineer certified test reports from an approved testing laboratory indicating that the epoxy bonding agent material has passed all required tests. Upon request, the Contractor shall also furnish to the Engineer, samples of the epoxy bonding agent material for independent testing

**F.** **Physical Requirements and Qualification Tests.** Epoxy bonding agents proportioned as designated by the Manufacturer and mixed in accordance with the manufacturer's recommendations shall meet the physical requirements given below. The components of the epoxy-bonding agent shall be conditioned to the temperature at which testing is to be done prior to mixing the test specimen.

**1.** **Consistency (Sag-Flow).** This property determines application workability of the epoxy-bonding agent. Mixed epoxy bonding agent shall be tested and conform to the prescribed consistency in accordance with ASTM C 881-99 at the maximum temperature of the temperature range for the formulation being tested. The average sag-flow shall not exceed 1/4 inch.

**2.** **Gel Time.** This property is the period of time during which the epoxy-bonding agent remains workable in the mixing container and during which it must be applied to the match cast joint surfaces.

The mixed epoxy bonding agent shall be tested and conform to the prescribed gel time in accordance with ASTM C 881-99 at the maximum temperature of the temperature range for the formulation being tested. The gel-time shall be at least 30 minutes.

**3.** **Contact Time (open Time) and Contact Strength.** This property is the workable period of time allowable between mixing of the components of the epoxy bonding agent, application of the epoxy to the joint face(s), and joining the segments under an approximately uniform pressure of 40 psi.

The contact time (open time) of the mixed epoxy-bonding agent shall be:

| | |
|---|---|
| Normal-Set Epoxy | 60 Minutes, Minimum |
| Slow-Set Epoxy | 8 Hours, Minimum |

The above contact time (open time) shall be deemed acceptable if a slant cylinder test specimen, prepared and tested in accordance with the conditions below, sustains the following stress (contact strength) on the slant plane calculated as the axial (vertical) load divided by the area of the slant ellipse:

| | |
|---|---|
| Normal-Set Epoxy | 1,000 psi at 48 hours after joining |
| Slow-Set Epoxy | 1,000 psi at 14 days after joining |

The cement mortar / concrete material for the slant-cylinder test shall have a compressive strength of at least 4,500 psi at 28 days when tested to ASTM C 39. The slant-cylinder test procedure shall be in accordance with ASTM C 882 with the following modifications.

a. Prior to the application of the epoxy-bonding agent the concrete specimens shall be soaked in water for 24 hours at the maximum temperature of the application temperature range for the formulation being tested.

b. The two components of the epoxy-bonding agent shall be brought to the maximum of the application temperature for the formulation being tested before being mixed and applied to the specimens.

c. The sloped surfaces of the concrete specimens shall be dried for ten minutes on an absorbent material. Immediately after drying, the epoxy-bonding agent shall be applied to both sloped surfaces to a thickness of 1/16 inch.

d. Joining of the sloped surfaces shall be delayed for the following period of time, measured from the time the epoxy was mixed:

| | |
|---|---|
| Normal-Set Epoxy | 60 Minutes |
| Slow-Set Epoxy | 8 Hours |

e. During the period between mixing of the epoxy and joining of the sloped surfaces, the specimens shall be uncovered and maintained at the maximum temperature of the application range for the formulation tested.

f. The specimens shall then be assembled together and cured at the maximum temperature of the formulation range (48 hours for normal set and 14 days for slow set epoxies) prior to testing.

NOTE: For slow-set epoxy, an additional test specimen shall be made and tested to failure at 24 hours. The formulation of the slow set epoxy is acceptable only if the epoxy-bonding agent exhibits a brittle break.

4. **Compressive Yield Strength.** This property is the compressive yield strength of the epoxy-bonding agent at various ages. Comparison of this property between batches is an indication of the level of quality control achieved in manufacturing the material.

The required compressive yield strength of the epoxy-bonding agent shall be in accordance with ASTM C-881-99 when tested using ASTM Method D 695 with the following conditions:

a. Epoxy bonding agent shall be poured into the mold for forming specimens within ten minutes after starting mixing of the components.

b. The specimens shall be cured at the minimum temperature of the formulation range for a period of 24 hours.

c. The compressive yield strength shall be at least:

| | |
|---|---|
| Normal-Set Epoxy | 2,000 psi (14 MPa) at 24 hours |
| | 6,000 psi (41 MPa) at 48 Hours |
| Slow-Set Epoxy | 1,000 psi (7 MPa) at 36 Hours and |
| | 2,000 psi (14 MPa) at 72 Hours |

5. **Bond Strength.** This property is the strength of epoxy bonding agent as it bonds with concrete. Bond strength shall be in accordance with ASTM C 881-99 and the test is conducted on a slant cylinder according to ASTM C 882-99 with the following modifications.

a. The test cylinder of concrete shall have a compressive strength of at least 6,000 psi at seven days age.

b. The specimens shall be prepared as for item 3 (contact time and contact strength) above.

The required bond strength of the epoxy-concrete interface - calculated as the axial (vertical) load divided by the area of the slant ellipse - shall be at least:

| | |
|---|---|
| Normal-Set Epoxy | 1,000 psi at 48 Hours |
| Slow-Set Epoxy | 1,000 psi at 14 Days |

6. **Heat Deflection Temperature of Epoxy Bonding Agent.** The heat deflection temperature shall be in accordance with ASTM C 881-99 - i.e. 120ºF at 14 days - when the specimen is tested using ASTM Method D 648.

7. **Alternative Preparation of Slant Cylinder Specimens.** Test specimens of concrete may be prepared in standard 6 by 12 inch cylinder molds to have a height at midpoint of 6 inches and an upper surface with a slope at 30 degrees (±1 degree) with the vertical. The upper and lower portions of the specimen with the slant surfaces may be formed through the use of an elliptical insert or by sawing a full sized 6 by 12 inch cylinder. If desired, 3 by 6 inch or 4 by 8 inch specimens may be used.

The sloped surfaces shall be free from bumps, edges or high spots over 1/32 inch in magnitude and the sloped surfaces shall not deviate from plane by more than 1/8 inch. After moist curing and after the concrete has attains the required compressive strength, slant surfaces shall be prepared by light sandblasting or stoning and washing with clean water.

After the concrete halves have been joined with epoxy bonding agent according to the required conditions for the property being tested, the joined specimen shall be tested in accordance with ASTM C 39 (Test method for Compressive Strength of Cylindrical Concrete Specimens).

**G. Epoxy Bonding Material Qualification Tests, Quality Control, Quality Assurance and Certification of Supply**

**1. Qualification Tests.** Results of Qualification Tests for each formulation temperature range of the epoxy-bonding agent shall be provided from an independent laboratory engaged by the Manufacturer and approved by the Engineer. Independent qualification tests shall be required for each Manufacturer and formulation temperature range of epoxy-bonding agent. An epoxy-bonding agent, or formulation, will not be accepted unless it meets the Qualification Tests. The Engineer may accept Qualification Tests from previous applications of the same epoxy formulations. However, new material shall be made and supplied for this project (i.e. old stock shall not be used.).

**2. Quality Control.** For Quality Control, the Contractor shall provide the Engineer with certified copies of reports of routine tests by the Manufacturer for each lot of epoxy bonding agent supplied to the project. Routine, quality control tests shall be made for consistency (sag-flow), gel-time, and compressive yield strength for each lot.

**3. Quality Assurance.** For Quality Assurance, the Contractor shall provide the Engineer with certified copies of reports of repeat Qualification Tests made by an independent laboratory engaged by the Manufacturer and approved by the Engineer. Only one repeat Qualification Test shall be required for each formulation for each Manufacturer in addition to the initial Qualification Tests - providing that the material demonstrates good performance in use and application on site and that each lot meets the Quality Control requirements. If performance fails to satisfy job-site use, then the Engineer may require additional Qualification Tests, or other approved action by the Contractor, to maintain the quality.

## CONSTRUCTION

**525.03 Construction.**

**A. General.** An epoxy bonding agent meeting the requirements of this specification shall be applied to joining surfaces of all precast concrete match-cast segments through which embedded post-tensioning ducts pass, unless otherwise specified on the Plans.

Prior to the manufacture of epoxy for the project, a site meeting will be held with representatives from the Engineer, Contractor and epoxy Manufacturer, to discuss the appropriate temperature ranges, storage and handling, mixing and application of the epoxy.

**B. Substrate Temperatures and Epoxy Formulation.** The epoxy-bonding agent shall be applied only when the substrate temperature of both surfaces to be joined is between 40ºF and 105ºF. The formulation of epoxy bonding agent shall have an application temperature range that conforms to the substrate temperature of the surfaces to be joined. If the surfaces have different substrate temperatures, the formulation for the higher temperature shall be used during hot weather periods and the formulation for the lower temperature during cold weather periods.

The Contractor shall plan his erection and post-tensioning operations such that the time lapse from the initial mixing of components for the first batch of epoxy-bonding agent, closing the joint and applying the minimum required contact pressure, does not exceed 70 percent of the contact time for the particular formulation.

**C. Contact Pressure.** The purpose of the minimum and as uniform as possible contact pressure is to ensure proper mating of the surfaces and squeezing of the epoxy to completely fill and seal the joint with a finished thickness as even as possible.

A minimum closing contact pressure of approximately 40 psi shall be applied to each epoxy joint during the curing period* for the epoxy. The pressure on the new joint shall be as uniform as possible, consistent with the Contractor's means and methods of erection. The Contractor's means and methods of erection shall ensure the minimum required contact pressure for the curing period. Contact pressure may be attained through combinations of weight and temporary and/or permanent post-tensioning.

The minimum contact pressure may be increased at any time after the epoxy has taken an initial set*. However, the minimum contact pressure may only be reduced after the epoxy in the joint has properly hardened and cured. If the minimum contact pressure is reduced, the joint shall not be subject to local tensile stress for a further 7 days or until the pier column is complete, whichever is the sooner.

Prior to construction, the Contractor shall submit to the Engineer for review, details addressing how the required contact pressure and duration will be achieved for the erection of segments.

* Initial Set and Curing Period - in the context of the erection of the segments, the initial set and curing periods are as follows.

For a given temperature formulation the initial set is the point at which the epoxy in the joint has fully gelled. Without the use of artificial means to accelerate the process, this time, as a minimum, is the gel-time for the type of epoxy, application and conditions of use.

For a given temperature formulation the curing period is the time required for the epoxy to become fully hardened after application and closing of the joint under the contact pressure. Without the use of artificial means of heating or accelerating the cure, for a normal set epoxy, this period is usually 24 hours and for a slow set epoxy, usually at least 72 hours.

**D. Qualifications of Contractor's Personnel.** The work of mixing, handling and applying the epoxy-bonding agent shall be under the direct supervision of a person who has extensive knowledge of and experience in the use of this material. The Engineer may require the Contractor to arrange for a technical representative of the manufacturer to be at the site as an advisor at the beginning of this operation.

The Contractor shall ensure that all personnel who will be working with the epoxy-bonding agent are thoroughly familiar with the safety precautions necessary when handling this material.

**E. Cleaning of Surfaces to be Joined.** The surfaces to which the epoxy bonding agent are to be applied shall be free from oil, form release agent, laitance or any other deleterious material that would prevent the epoxy-bonding agent from bonding to the concrete surface. The surfaces shall be cleaned by light sandblasting, wire brushing or light use of high-pressure water blasting (with a minimum pressure of 2,500 psi and a maximum of 6,000 psi) in a manner that does not destroy the surface shape and profile of the mating surfaces.

The mating faces shall a dry surface with no free moisture on them at the time the epoxy-bonding agent is applied. Free moisture will be considered to be present if a dry rag, after being wiped over the surface, becomes damp.

**F. Mixing Epoxy Bonding Agent.** Only epoxy-bonding agent components from full containers, opened immediately prior to being mixed shall be used. Components, for which the shelf life indicated on the containers has expired, shall not be used. Each container of a component shall be thoroughly mixed prior to combining components.

The two components of the epoxy-bonding agent shall be combined and thoroughly mixed in strict accordance with the manufacturer's recommendations using a properly sized mechanical mixer operating at no more than 600 rpm.

Mixing of the epoxy- bonding agent shall be scheduled so that the material in a batch is applied to the face of the joint within 20 minutes after the components are combined. It is recommended that the mating surfaces be brought within approximately 18 inches of each other prior to mixing epoxy. At his discretion, the Engineer may require a dry run to check fit of the surfaces before applying epoxy.

**G. Applying Epoxy-Bonding Agent.** The epoxy-bonding agent shall be applied immediately after mixing. It shall be uniformly applied to a nominal thickness of 1/16 inch in accordance with the manufacturer's recommendations with a spatula or by gloved hand. The material shall be applied to only one of the faces to be joined except that material shall be applied to both faces in the vicinity of post-tensioning ducts. No material shall be placed within ½ inch of a post-tensioning duct except, regardless of spacing, a bead of epoxy bonding agent shall be applied between all adjacent post-tensioning ducts.

No epoxy-bonding agent shall be used from a batch for which the time since combining components exceeds 20 minutes.

**H. Mating of Segments.** Immediately after each mating surface has been covered with epoxy, the segments shall be brought together and the contact pressure applied. After applying the contact pressure, a discernable bead line of epoxy bonding agent must be apparent along the entire exposed edges of a joint. If a bead is not properly extruded, or if the filling of the joint with epoxy is incomplete, the Contractor shall take appropriate action to seal the joint and modify procedures, to the approval of the Engineer.

**I. Cleaning Joints and Swabbing Ducts.** All excess epoxy-bonding agent shall be cleaned from exterior surfaces of the concrete segment in such a way as to not damage or stain the concrete surface. Excess epoxy squeezed from the joint shall be captured and not allowed to free-fall from the structure.

Immediately after concrete segments are joined, a swab shall be passed through each empty post-tensioning duct to smooth out any epoxy-bonding agent in the duct. When slow-set epoxy is used, the swab shall be passed through all the segments adjacent to uncured epoxy after each new segment is erected.

**J. Thermal Controls.**

**1. Cooling in Hot Weather.** Epoxy joining shall not proceed if the substrate temperature exceeds 115°F. The Contractor may take precautions to keep the mating surfaces cool by shading and/or wetting with clean water except that the above requirements for dry mating surfaces at the time of application of epoxy shall be strictly followed.

**2. Artificial Heating in Cold Weather.** If the Contractor elects to erect segments in cold weather when the substrate temperature of the joint surfaces of concrete segments is below 40°F, then he shall provide an artificial environment to increase the substrate temperature subject to the following restrictions.

a. The artificial environment shall be created by an enclosure surrounding the joint through which warm air is circulated, or heat provided by radiant heaters.

b. The temperature of the concrete substrate shall be raised to at least 40°F to a depth of approximately 3 inches beneath the surfaces to be joined.

c. Localized heating shall be prevented and the temperature of the substrate shall not exceed 105°F at any point on the surface of a joint. Direct flame heating of the concrete shall not be allowed.

d. The temperature of substrate surfaces shall be maintained between 40°F and 105°F for at least 24 hours after joining of the surfaces for normal-set epoxy and 72 hours for slow-set epoxy.

e. Epoxy jointing may proceed if the substrate is above the minimum temperature for the formulation and air temperature is above 45°F and rising.

The Contractor may propose, for review by the Engineer, an optional method of raising and maintaining the substrate temperature of the joint surfaces. Any optional method shall meet the restrictions set out above. The Engineer will base his approval of an optional method on it accomplishing an environment suitable for the epoxy-bonding agent to perform satisfactorily.

**K. Failure to Comply with Time Limits or Incomplete Jointing.**

**1. Time Limit.** If the time limit between mixing of the epoxy-bonding agent and the application of the contact pressure is exceeded, or if the joint is incompletely filled and sealed, then the concrete segments shall be separated. All epoxy shall be removed from the faces using spatulas and approved solvent. Cleaning materials shall be on-hand in the event of an aborted joining. Epoxy shall not be re-applied until the faces have been properly cleaned and solvents dispersed, for a period of 24 hours. No additional payment shall be made for this work.

**2. Failure to Provide Watertight Seal.** In the event that water seepage through the joint at an epoxy precast segment joint becomes evident; the Contractor shall take measures to seal the joint such as applying a gravity feed low viscosity concrete crack sealer or epoxy pressure injection. Proposed methods for sealing leaking segment joints shall be submitted to the Engineer for approval. No additional payment will be made for sealing leaking segment joints.

**L. Shimming of Joints.** Shimming of joints with fiberglass matting to correct alignment shall not be allowed.

**M. Removal of Support to Segments – General.**

**1. General.** Removal of temporary post-tensioning providing the minimum contact pressure, if required, or removal of independent means of support to segments, shall be in accordance with the Contractor's approved means and methods of erection.

**N. Record of Segment Joining.** On a weekly basis, or as otherwise agreed with the Engineer, the Contractor shall provide the Engineer with the following information, for the period when precast segments are being erected.

**1. General.**

a. Weather conditions.

b. Air temperature at the site on an hourly basis.

**2. For Each Joint**

a. Location of joint by segment numbers
b. Date and time of day of jointing
c. Lot number for the epoxy bonding agent components.
d. When application of epoxy began, the temperature of the concrete surface of the joint at the middle of each concrete segment.
e. Time of mixing the first batch of epoxy bonding agent applied to the joint.
f. Time of applying the specified contact pressure to the joint.

**3. Results of any on-site tests performed that week.**

**MEASUREMENT AND PAYMENT**

**525.04 Measurement and Payment.** No separate payment will be made for the work of epoxy joining of precast concrete segments. The cost of this work, including all testing and any temporary post-tensioning to achieve contact pressure across joints, shall be included in payment for the precast concrete items.

# SECTION 526 – GROUND VIBRATION MONITORING AND CONTROL

**526.01 Description.**

Vibration monitoring and control shall consist of the monitoring of vibration levels and the control of means and methods of foundation construction and pile driving adjacent to the existing bridge as well removal of the existing piles, as directed by the Engineer. This work shall consist of the following:

1. Pre-construction and post-construction inspections of the existing bridge, as directed by the Engineer.
2. Developing a program to monitor the ambient and construction vibrations and settlements at the existing bridge.
3. Developing a program to limit the construction vibrations at the bridge to an acceptable level.

**526.02. Quality Assurance.**

All work shall be performed under the direct supervision of a professional engineer registered in the state of New Jersey. The Engineer must have at least ten (10) years responsible experience in similar work and have or have available professional level capability in related geotechnical and structural evaluations and engineering.

**526.03 Scope of Work.**

**A. Vibration Monitoring and Control Program.** The Contractor shall prepare a vibration monitoring and control program as follows:

1. Install one receptor on the bridge at a point closest to the pile driving and bridge footings to measure and record peak particle velocity before and during construction operations on three mutually perpendicular directions using a portable velocity recorder. If the vibration at the bridge exceeds the estimated damage particle velocity as determined by the contractor's expert, the construction activities shall be stopped and the Engineer shall be notified.
2. In addition to the vibration monitoring, the Contractor shall monitor settlements at the existing bridge. The Contractor shall establish a fixed points on the bridge footing or piles at a point closest to the pile driving activities, and measure the elevation of the fixed point with respect to a bench mark at the end of each day during the construction of the proposed foundations. If the difference between the preconstruction and during construction elevations of the fixed point exceeds 1/8 inch, the construction activities shall be stopped and the Engineer shall be notified.
3. The vibration monitoring and construction control program report shall include the following:
   a. Summary;
   b. Assessment of vibration susceptibility of the bridge including estimated damage threshold particle velocity;
   c. Predicted construction vibrations at the bridge;
   d. Identification of structural components that could be damaged by the construction vibrations;

e. Description of limitations or modifications of construction equipment or methods to preclude structural damage;
f. Description of monitoring program for vibration susceptible structural components.

The Contractor shall perform construction operations and vibration monitoring in accordance with the approved program report. Changes in the program where conditions are not as anticipated must be approved by the Engineer.

The Contractor shall submit seven copies of the report to the Engineer for review and approval prior to any foundation construction and pile driving adjacent to the existing bridge.

**B. Reference Documents.** A copy of the latest bridge inspection report of the existing bridge will be made available to the Contractor upon written request to the Engineer.

**C. Repair of Damage.** Any damage to the existing bridge caused by the Contractor's activities during the construction of the proposed footings shall be repaired by the Contractor to the Engineer's satisfaction at no additional cost to the State.

**526.04 Method of Measurement.**

Vibration monitoring and control will not be measured and payment will be made on a lump sum basis.

**526.05 Basis of Payment.**

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| VIBRATION MONITORING AND CONTROL | LUMP SUM |

The payment will be made based on the following schedule:

1. When the first work on foundations and pile driving begins, the Contractor will be paid 20% of this item.
2. The remaining 80% will be paid equally for each of the remaining 9 foundations when the Contractor begins work at these locations.

# DIVISION 600 - INCIDENTAL CONSTRUCTION

## SECTION 602 - PIPES

**602.02 Materials.**
THE ENTIRE SUBSECTION IS CHANGED TO:

Materials shall conform to the following Subsections:

| | |
|---|---|
| Ductile Iron Culvert Pipe | 913.02 |
| Ductile Iron Water Pipe | 913.03 |
| Concrete Pipe | 913.04 |
| Corrugated Aluminum Alloy Culvert Pipe and Pipe Arches | 913.05 |
| Corrugated Steel Culvert Pipe and Pipe Arches | 913.07 |
| Corrugated Steel Sewer Pipe and Pipe Arches | 913.08 |
| High Density Polyethylene (HDPE) pipe | 913.11 |
| Mortar and Grout | 914.03 |
| Gaskets | 919.08 |

Portland cement concrete for pipe plugs, encasements, or saddles shall conform to Section 914.

Where corrugated metal culvert pipe is designated, corrugated aluminum alloy culvert pipe or corrugated steel culvert pipe may be used.

Where corrugated metal culvert pipe arch is designated, corrugated aluminum alloy culvert pipe arch or corrugated steel culvert pipe arch may be used.

End sections shall be of the same material as the pipe or pipe arch to which the end sections are attached, except that end sections for HDPE pipe for outfall systems shall be concrete.

For jacked pipe, reinforced concrete culvert pipe shall conform to Subsection 913.04 except that the pipe shall be Class V, Wall B, tongue and groove type.

The tube material shall conform to the requirements of ASTM F 1216. The tube shall be fabricated to a size that, when installed, conforms to the internal circumference and length of the original pipe.

The wall color of the interior tube surface after installation shall not be of a dark or non-reflective nature that could inhibit proper closed-circuit television inspection.

All HDPE pipe shall be type S (smooth interior with annular corrugations), with gasketed silt-tight joints according to AASHTO M294

All HDPE pipes shall be in compliance with the requirements of the National Transportation Product Evaluation Program's (NTPEP) evaluation of HDPE and thermoplastic pipe. NTPEP test results shall be furnished to the Resident Engineer and to the Bureau of Materials Engineering and Testing before construction operation.

**602.03 Construction Requirements.**
THE SUBSECTION HEADING AND ENTIRE TEXT ARE CHANGED TO:

**602.03 Construction and Inspection Requirements.**

**A. Construction.** Excavation, bedding, backfilling, and disposal of excess material shall conform to Section 207 and the following:

1. Trench openings shall not remain open overnight, unless adequately protected, within or adjacent to roadways on which traffic is being maintained or within the normal limits of pedestrian access.
2. When installing storm drains across private property, the topsoil and sod disturbed by excavation operations shall be salvaged for use in restoring the area to its original condition.
3. Except where necessary to maintain flow, drains shall not be placed in embankment until it has been constructed to a height of at least 3 feet above the top of the pipe or to the top of the embankment, whichever is lower, and then a trench shall be excavated for placing of the pipe.
4. Before the installation of HDPE pipe, and at the discretion of the Resident Engineer, a technical representative from the pipe manufacturer shall be on site for the first day of pipe installation to validate proper installation procedures.
5. Existing drainage flow during construction shall be maintained until proposed drainage facilities are completed and put into service.

6. Pipe shall be handled and stored carefully in order to prevent damage such as cracking, denting and breaking. Pipe shall be lifted off of the delivery vehicle in order to avoid damage while unloading. Pipe shall not be dragged off the vehicle. Pipe shall be stored in an area where it will not be damaged during construction operations. When pipe is stacked, it shall be properly blocked or strapped, and the bell and spigots shall alternate to reduce the load on the bells. Pipe that is damaged, bowed or considered unacceptable for other reasons will be rejected by the Engineer and shall not be used on the Project.
7. If heavy construction equipment (100 kips axle load) will be used in or over the vicinity of HDPE pipe or corrugated aluminum alloy culvert pipe, a temporary compacted cover of a minimum of 4 feet shall be placed over the top of the pipe. The materials for the temporary cover shall be excavated material free from stones larger than 2 inch for concrete pipe, 1½ inch for HDPE and 1 inch for corrugated steel pipe.
8. Sections of pipe damaged during construction shall be removed and replaced.

**B. Inspection.**

**1. Video Inspection of Pipe.**

Video inspection of pipe has been waived for this project.

**2. Deflection Inspection of HDPE Pipe.**

Approximately 25 percent of the length of HDPE pipe shall be tested for deflection no sooner than 30 days after installation. Perform the deflection testing using either electronic deflectometers, calibrated television or video cameras, properly sized "go, no-go" mandrel, direct measurement extension rulers and tape measures in pipes that permit safe entry, or another acceptable device.

Where deflection is greater than 5 percent of the base inside diameter, the Contractor shall develop and submit a remediation or replacement plan to the Resident Engineer for approval.

Remedial action may include but is not limited to removal and replacement or an accepted repair procedure.

**602.04 Laying of Pipe.**

THE LAST PARAGRAPH IS CHANGED TO:

Pipe will be inspected before and during backfilling operations. Any pipe found to be out of alignment, excessively settled, lifted, or damaged shall be removed and relaid or replaced.

**602.05 Joining Pipe.**

THE FIRST PARAGRAPH IS CHANGED TO:

Joints for rigid pipe shall be made with mortar, grout, or gaskets. Other types of joints recommended by the pipe manufacturer may be permitted as approved by the Resident Engineer. Corrugated metal pipe shall be joined by coupling bands.

THE FOLLOWING IS ADDED AFTER THE LAST PARAGRAPH:

The use of split couplings for HDPE pipe shall not be permitted unless approved by the Resident Engineer for use in joining field cuts. All joints shall be of the bell and spigot, or bell and spigot type with a gasket according to ASTM F 477 to provide a silt-tight seal. Pipe connections shall be constructed according to the manufacturer's recommendations for assembly of joint components, lubrications and making of joints. The pipe fittings shall be free of inclusions and visible defects. The ends of the pipe shall be cut squarely so as not to adversely affect joining.

**602.10 Method of Measurement.**

**602.11 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE DELETED:

| | |
|---|---|
| ___" X ___" REINFORCED CONCRETE CULVERT PIPE ARCH, CLASS ___ | LINEAR FOOT |
| ___" X ___" REINFORCED CONCRETE SEWER PIPE ARCH, CLASS ___ | LINEAR FOOT |

THE FOURTH PARAGRAPH IS CHANGED TO:

Separate payment will not be made for material used as a temporary cover over corrugated aluminum alloy culvert pipe or HDPE pipe.

## SECTION 603 – INLETS AND MANHOLES

**603.01 Description.**
THE FOLLOWING IS ADDED:

Stormwater Treatment System:
The Stormwater Treatment System includes the installation of Manufactured Treatment Devices (MTDs), which consist of precast concrete structures with chambers for the treatment and removal of oil and sediment removal system.

Trench Drains and Trench Drain Catch Basins shall consist of the construction of 8" inside diameter trench drain and catch basins using a cast in place forming system. Trench drain shall consist of non-CFC expanded polystyrene (EPS) forms with radius bottom, pre-sloped and/or non-sloping removable form, embedded steel inlay rails; no-float legs for alignment and anchoring; and grates, with a non-rigid four point, longitudinal & vertical restrained grate retention system.

Permanent Turf Reinforcement Mat shall consist of the construction of a geotextile as shown on the plans.

Reset Pavers shall consist of resetting the pavers as shown on the plans.

**603.02 Materials.**
THE FOLLOWING IS ADDED:

Permanent Turf Reinforcement Mat shall conform to subsection 919.06 for channel lining.

Trench forms shall be pre-manufactured using non-CFC EPS foam. Each radius bottom form segment shall be 8 inches wide I.D. with a full length deforming grooves and 9.5 inches grate seat width. Non-petroleum based form release for smooth interior walls and easy form removal is to be used. Form segments are to provide trench dimensional accuracy of 1/16". Trench slope is as specified on the drawings.

Steel components for trench drain system: Post fabrication hot dipped galvanized 31.75mm x 31.75mm x 3.18mm (1.25" x 1.25" x 0.125") steel angle rails conforming to ASTM A36/A36M-93a. Galvanizing to conform to ASTM A123-89a. No Float leg / alignment / grate retainer anchor lugs are located on 1.0M (3.28ft) centers along the rails bisected by non-removable grate retaining / rail anchoring studs on 1.0M (3.28ft) centers. Standard headed concrete anchor studs bisect these members providing a rail-anchoring device every 250mm (9.84"). Grate rails to provide a minimum of 0.87 square inches concrete bearing area per inch of trench length on each side. Grate retainers and rails to withstand 1,000lbs vertical upward, 6,000lbs transverse, and 6,000lbs longitudinal loads. Grate retainer performance is not to degrade with service loads or thermal cycling.

Grates for the trench drain system shall be uncoated ductile iron conforming to ASTM A 536-84 with a minimum of 0.14m2/Lm (0.47ft2 /LFt) open area. Grates must be flush with top of rails and meet AASHTO M306-9 Grate/Manhole Proof Test. Allowable tolerances to plus/minus 1.5mm (1/16"). Grating shall be made in USA, and shall conform to the FHWA "Buy America" policy 23 CFR 635.410(b) (as amended by enactment of the 1991 ISTEA) if Federal Aid finances apply.

The trench drain catch basin shall conform to the following:

Forms –Trench forms to be pre-manufactured using non-CFC EPS foam, 21.25" x 24" x 36" and provide dimensional accuracy of 1.5mm (1/16").

Rails– Steel components: Post fabrication hot dipped galvanized 1.75" x 1.75" x 3/16" steel angle rails conforming to ASTM A36/A36M-93a. Galvanizing to conform to ASTM A123-89a. Standard headed concrete anchor studs bisect these members providing a rail-anchoring.

Grating- Grates to be uncoated 23" x 24" x 1 ½" cast gray iron. Allowable tolerances to plus/minus 1.5mm (1/16"). Grating shall be made in USA, and shall conform to the FHWA "Buy America" policy 23 CFR

635.410(b) (as amended by enactment of the 1991 ISTEA). Grates shall conform to AASHTO M 306-89, Drainage Structure Castings. The grates shall be retained to the rail at all four corners.

A Certificate of Compliance in conformance with the provisions of these Standard Specifications shall be furnished to the Engineer upon request for the trench drain and the trench drain catch basin.

STORMWATER TREATMENT SYSTEM:

The stormwater treatment system shall consist of a precast concrete chamber fitted with suitable hydraulic controls to provide removal of sediment and oil from stormwater entering the chamber. The system shall be capable of long-term removal of 80% of the total suspended solids in the stormwater passing through the unit. The system shall not re-suspend trapped sediments or re-entrain floating contaminants at flow rates up to the and including the peak treatment capacity listed.

| Device | Peak treatment flow (cfs) | Peak system flow (cfs) |
|---|---|---|
| MTD-1 | 1.8 | 3.6 |
| MTD-2 | 7.1 | 13.9 |
| MTD-3 | 9.3 | 19.3 |

The selected MTD shall be of a type approved by NJDEP. As of June 10, 2005 approved device manufacturers included:

Stormwater Management, Inc.
Vortechnics, Inc.
CDS Technologies, Inc.
Stormceptor Group of Companies
BaySaver Technologies, Inc.
Hydro International

A current list of approved devices can be found at:
http://www.state.nj.us/dep/dsr/bscit/CertifiedMain.htm

Direct access shall be provided by means of standard NJDOT manhole frames and covers .

The Stormwater Treatment System shall be of a type that has been installed and in use successfully for a minimum of 5 years. The manufacturer of the said system shall have been regularly engaged in the engineering design and production of such systems.

The Stormwater Treatment System manufacturer shall furnish documentation that supports all product performance claims and details storage capacities and maintenance requirements.

The contractor shall submit, to the Engineer, prior to the installation of the stormwater treatment system, an affidavit regarding patent rights stating that any suit or claim against the Department due to alleged infringement rights shall be defended by the contractor who will bear all costs, expenses and attorney's fees incurred thereof.

The MTDs shown on the contract drawings are as manufactured by Vortechnics, Inc. If an approved alternate to the MTD shown on the contract drawing is chosen by the contractor, the contractor shall be required to submit for approval pertinent shop drawings, pipe layouts, product data sheets and computations for the selected MTD

Butyl mastic sealant for joints shall conform to ASTM C 990.

Internal metal components shall be 6.35 millimeters thick aluminum alloy 5052-H32 conforming to ASTM B 209.

Internal plastic components shall be high-density polyethylene conforming to ASTM D 1248, D 3350, and F 894.

The stormwater treatment system shall be capable of sustaining HS20-44 loading requirements.

Precast sections shall have tongue and groove or ship lap joints.

Pipe openings shall be sized to accept pipes of the specified sizes and shall be sealed with hydraulic cement conforming to ASTM C 595M.

The Stormwater Treatment System shall adhere to the minimum performance specifications listed below.

**603.03 Excavation and Backfilling**
THE FOLLOWING IS ADDED:

Excavation for Special Manholes detailed on the Plans shall be three feet below the bottom of proposed structure and backfilled with three feet of Coarse Aggregate, size number 67. Payment for excavation and placement of Coarse Aggregate will be included in the unit cost for the Manhole.

Excavation for Stormwater Treatment System units shall be two feet three inches below bottom of proposed structure to accommodate pile supported concrete foundation. Payment for excavation will be included in the unit cost for Stormwater Treatment System.

**603.04 Concrete Construction.**

THE FOLLOWING IS ADDED:

Formwork assembly must be prevented from floating during concrete placement without penetrating the sub grade. Formwork to be anchored to the earth using steel no-float legs and an anchor slab pour. Tie wires that assure constant rail spacing and grate seat dimension to be provided.

**603.06 Precast Concrete Inlets and Manholes.**
THE FOLLOWING IS ADDED:

STORMWATER TREATMENT SYSTEMS:

The contractor shall utilize a crane of appropriate size for the construction of the precast stormwater treatment system.

Excavation and backfilling shall be in conformance with Subsection 603.03.

The base unit shall be placed on a coarse aggregate (size No. 57) bedding layer o a minimum thickness of six inches after compaction on the concrete foundation. The coarse aggregate bedding layer shall be checked for level prior to setting and the precast base section shall be checked for level at all four corners after it is set. If the slope from any corner to any other corner exceeds 0.5 percent the base section shall be removed and the course aggregate bedding layer re-leveled.

Butyl mastic sealant shall be applied to all joints of the treatment system just prior to setting subsequent sections.

The space between the pipe and the pipe opening shall be sealed with hydraulic cement.

The circular swirl chamber shall be bolted to the side walls at the 3 tangent points and/as recommended by the manufacturer. The bottom edges of the swirl chamber and side walls at the tangent points shall be sealed with a butyl mastic sealant and/or as recommended by the manufacturer.

Prior to setting the precast roof section, butyl mastic sealant shall be placed along the top of the underflow baffle wall, using more than one layer of mastic to obtain a thickness of at least one inch greater than the nominal gap between the top of the baffle and the roof section. The nominal gap shall be determined either by field measurements or the shop drawings. The construction of the flow controls shall be according to the manufacturer's recommendations. After placement of the roof section has compressed the butyl mastic sealant in the gap, finish sealing the gap with approved non-shrink grout on both sides of the gap using the butyl mastic as a backing material to which to apply the grout. Non-shrink grout shall be applied to the joints at the side edges of the baffle walls.

After setting the precast roof section of the stormwater treatment system, set precast concrete manhole riser sections or masonry, if required, to the height required to bring the manhole frame and cover to grade. Fill the outside joints with a comparatively dry mortar (one part cement and two parts sand) and finish flush with the adjoining surfaces. Precast sections shall be set in a manner that will result in a watertight joint.

Plug holes in the concrete sections made for handling or other purposes with a non-shrink grout or by grout in combination with concrete plugs.

Where holes must be cut in the precast sections to accommodate pipes, do all cutting before setting the sections in place to prevent any subsequent jarring which may loosen mortar joints.

All stormwater treatment systems shall be filled with water up to the lowest pipe invert and tested for exfiltration. Any loss of water constitutes a system that is no watertight and the leak shall be found and corrected.

The swirl chamber shall be tested for leaks by adding water to that portion of the system outside the chamber to a level just below the lowest opening in the chamber. If water flows into the swirl chamber, the leak must be found and corrected as recommended by the manufacturer. If leaks appear on the outside of the system, the inside joints shall be cleaned and caulked as recommended by the manufacturer and to the satisfaction of the Engineer.

Working drawings and design calculations shall be submitted to the Engineer for approval in accordance with subsection 105.04.

**603.09 Castings and Fittings.**
THE FOLLOWING IS ADDED TO THIS SUBSECTION:

All pipe penetration locations in inlets and manholes shall be equipped with pipe connectors, as manufactured by A-Lok Products, Inc., or approved equal, cast into the concrete wall using a non-shrink grout. Stainless steel clamps for clamping the pipe to the pipe connector shall also be provided for field installation of piping. The manufacturer of pre-cast inlets or manholes shall provide the Engineer with drawings and/or detailed specifications for the pipe connector to be used for approval prior to construction

Locking frames and covers shall be provided on all drainage manholes located in easements and shall be Campbell Foundry Company Pattern No. 1486 or approved equal.

Water tight frames and covers shall be provided for all sanitary sewer manholes and shall be Campbell Foundry Company Pattern No. 1202B DTL-7 or approved equal. Covers shall be provided with steel drop lifting handle.

For all inlets and curb openings, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than 7 square inches, or be no more than 2 inches across the smallest dimention.

**603.12 Method of Measurement.**
THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Stormwater treatment systems of the various types will be measured by the number of each. Each MTD shall be considered to include the treatment device unit and its respective inflow and outflow pipe segments. No additional payment beyond the payment for the system, shown on the plans, will be made for reconfiguring the piping system to accommodate the selected MTD.

Trench drain will be measured by the linear foot. Trench drain catch basins will be measured by the number of units.

Permanent Turf Reinforcement Mat will be measured by the Square Yard.

Reset Pavers will be measured by the Square Yard.

**603.13 Basis of Payment.**
THE FOLLOWING IS ADDED TO THIS SUBSECTION:

| *Pay Item* | *Pay Unit* |
|---|---|
| MANUFACTURED TREATMENT DEVICE ____ | UNIT |
| TRENCH DRAIN | LINEAR FOOT |
| TRENCH DRAIN CATCH BASIN | UNIT |
| INLETS, DOUBLE E | UNIT |
| PERMANENT TURF REINFORCEMENT MAT | SQUARE YARD |
| RESET PAVERS | SQUARE YARD |

Separate payment will not be made for pipe connectors, excavation, coarse aggregate bedding and all incidental construction required for the manufactured treatment device.

THE FOLLOWING IS ADDED TO THIS SECTION:

## ELASTOMERIC CURVED BILL CHECK VALVE

**Description.**

This work shall consist of the construction of elastomeric curved bill check valves as shown on the plans.

## MATERIALS

**Materials.**

Check Valves are to be all rubber of the flow operated check type with a slip-on connection. When line pressure inside the valve exceeds the backpressure outside the valve by a certain amount, the line pressure forces the bills of the valve open, allowing flow to pass. When backpressure exceeds the line pressure by at the same amount, the bills of the valve are forced closed. The flat bottom allows the valve to be installed where minimal bottom clearance exists. The Check Valve is designed to slip over the specified pipe outside diameter and attached by means of vendor furnished stainless steel clamps. The port area shall contour down to a duckbill, which shall allow passage of flow in one direction while preventing reverse flow. The valve shall be one piece rubber construction with nylon reinforcement. The duckbill shall be offset so that the bottom line of the valve is flat, keeping the invert of the pipe parallel with the invert of the valve. The top of the valve shall rise to form the duckbill shape. In sizes 20" and larger, the bill portion shall be thinner and more flexible than the valve body, and formed into a curve of 180°.

The contractor shall submit product literature that includes information on the performance and operation of the valve, materials of construction, dimensions and weights, elastomer characteristics, flow data, headloss data, and pressure ratings in accordance with Subsection 105.04. Shop drawings shall clearly identify the valve dimensions. The manufacturer must have available flow test data from an accredited hydraulics laboratory to confirm pressure drop data. Company name, plant location, valve size and serial number shall be bonded to the check valve. Valves shall be manufactured in the USA. The supplier shall have at least ten (10) years experience in the manufacture of "duckbill" style elastomeric valves, and shall provide references and a list of installations upon request.

## CONSTRUCTION

### Installation.

The valve shall be installed in accordance with manufacturer's written Installation and Operation Manual and approved submittals.

An authorized representative of the manufacturer shall be available for customer service during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valve. The manufacturer shall also make customer service available directly from the factory in addition to authorized representatives for assistance during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valve.

## COMPENSATION

### Method of Measurement.

Elastomeric curved bill check valves will be measured by the number of units.

### Basis of Payment.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| ELASTOMERIC CURVED BILL CHECK VALVE | UNIT |

# SECTION 605 - CURBS

**605.01 Description.**

THIS SUBSECTION IS CHANGED TO:

This work shall consist of the construction of Portland cement concrete curbs and granite curbs, the resetting of belgian block curbs and granite curbs, and the removal and disposal of existing concrete barrier curbs.

**605.07 Concrete Curbs.**

**A. Limitations.**

THE SECOND ITEM OF THIS SUBPART IS CHANGED TO:

2. Concrete curb shall not be constructed from November 1 to March 15.

**B. Mixing, Placing, and Finishing Concrete.**

THE FOLLOWING IS ADDED AFTER THE FIRST SENTENCE:

The handling, measuring, proportioning, mixing, and placing of concrete for concrete barrier curb, bridge, HPC shall conform to Section 501 Concrete in Superstructure, HPC. Concrete for the concrete barrier curb, bridge, HPC shall be deposited only in the presence of the Engineer.

**605.10 Method of Measurement.**

THE FOLLOWING IS ADDED:

Reset Belgian Block Curb will be measured by the linear foot along the face of the gutter line.

**605.11 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Unit* |
|---|---|
| 15" X 32" CONCRETE BARRIER CURB ,BRIDGE, HPC | LINEAR FOOT |
| RESET BELGIAN BLOCK CURB | LINEAR FOOT |

## SECTION 607 – SIDEWALKS AND DRIVEWAYS

**607.01 Description.**

THE FOLLOWING IS ADDED:

Stone Walkway shall include the construction and/or reconstruction of decorative stone or gravel walkways where shown on the plans or as directed by the engineer.

**607.02 Materials.**

THE ENTIRE SUBSECTION IS CHANGED TO:

HMA shall conform to Section 903 except that the composition of the mixture for the top layer may also include up to 20 percent of RAP. Portland cement concrete shall conform to Section 914 except that driveways shall attain a strength of not less than 3,000 pounds per square inch in three days. Other materials shall conform to the following Subsections:

Soil Aggregate ..... 901.09
Prime Coat:
Cut-back Asphalt, Grade MC-30 or MC-70 ..... 904.02
Tack Coat:
Cut-back Asphalt, Grade RC-70 or RC-T ..... 904.02

Emulsified Asphalt, Grade RS-1, SS-1, or SS-1h ..... 904.03
Cationic Emulsified Asphalt, Grade CSS-1 or CSS-1h ..... 904.03
Curing Materials ..... 905.03
Preformed Expansion Joint Filler ..... 908.01
Reinforcement Steel ..... 915.03
Detectable Warning Surfaces ..... 905.06

Dense-graded aggregate for base course used with HMA sidewalk shall conform to Subsection 901.08.

Stone Walkways shall consist of 2 inches of Soil Aggregate Base Course and 4 inches of Plymouth Brown Mix amended with Stabilizer. The Stabilizer shall be blended to the Plymouth Brown Mix at the plant and delivered to the site ready for placement. The Stabilizer shall be added at a rate recommended by the manufacturer specifically for this project. Walkway aggregate and Stabilizer shall be as distributed by Geo. Schofield Inc., Bound Brook, NJ or approved equal. Other materials shall conform to the following sections:

Aggregate……..901
Soil Aggregate Base Course and Dense Graded Aggregate Base Course……301
Soil Aggregate Surface Course and Dense Graded Aggregate Surface Course……401

The material for Stone Walkways (stone or gravel) used in each case shall be as directed by the Engineer and shall conform as closely as possible to any existing walkway materials.

The compaction requirements in Subsection 301.05, Subparts 1 and 2, are waived for the Stone Walkway..

**607.06 Concrete Sidewalks, Driveways, and Public Sidewalk Curb Ramp Delineation.**
THE SUBSECTION HEADING IS CHANGED TO:

**607.06 Concrete Sidewalks, Driveways, and Detectable Warning Surfaces.**

SUBPART 5 HEADING AND ENTIRE TEXT ARE CHANGED TO:

5. **Detectable Warning Surfaces.** Immediately before installing safety red color and Detectable Warning Surfaces, the designated area shall be thoroughly cleaned and dried according to the manufacturer's recommendation. The installation of Detectable Warning Surfaces shall be according to the corresponding construction details and the manufacturer's recommendation. The background surface upon which the detectable warning surface is installed, silicon carbide 60 grit shall be evenly broadcast at a rate of 0.07 pounds per square yards for skid resistance.

   A list of approved manufacturers will be provided in the Special Provisions.

| Product Name | Manufacturer | Address / Phone No. |
|---|---|---|
| Safti-Trax/Duraback | Cote-L Industries, Inc. | 1542 Jefferson Street<br>Teaneck, NJ 07666<br>201-836-0733 |

   All areas determined to have been damaged or not to be in conformance with the Specifications or the Plans shall be removed and replaced at no additional compensation to the State.

THE FOLLOWING SUBSECTION IS ADDED TO THIS SECTION:

**607.06A Stone Walkways.**

Construction of Stone Walkways shall conform to the requirements of Sections 301 and 401.

**607.07 Method of Measurement.**
THE THIRD PARAGRAPH IS CHANGED TO:

Detectable Warning Surfaces will be measured by the square yard.

THE FOLLOWING IS ADDED:

Stone Walkway will be measured by the square yard.

**607.08 Basis of Payment.**
THE FOLLOWING PAY ITEM IS DELETED:

| *Pay Item* | *Pay Unit* |
|---|---|
| PUBLIC SIDEWALK CURB RAMP DELINEATION | SQUARE YARD |

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| DETECTABLE WARNING SURFACES | SQUARE YARD |
| STONE WALKWAY | SQUARE YARD |

## SECTION 616 – SLOPE AND CHANNEL PROTECTION

**616.07 Riprap Stone Slope or Channel Protection.**

THE FOLLOWING IS ADDED:

Riprap shall be constructed by placing riprap stones in close contact on flat grade adjacent to the outlet, and on top of a layer of coarse aggregate No. 57 in size.

The riprap stones shall be firmly bedded into the coarse aggregate. Open spaces between the placed riprap shall be filled with smaller stones of the same type and quality as the riprap stones. These smaller stones shall be firmly rammed into place. The larger of these stones shall be used in the lower courses.

The finished surfaces of the riprap stone conduit outlet protection shall be even.

Riprap shall be eighteen inches thick with a $d_{50}$ =6 (six) inches and shall be used as channel protection if not otherwise designated.

**616.08 Method of Measurement.**

THE FOLLOWING IS ADDED:

Riprap will be measured by the square yard.

**616.09 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| RIPRAP | SQUARE YARD |

THE LAST PARAGRAPH IS CHANGED TO:

Separate Payment will not be made for geotextiles and coarse aggregate placed under riprap stone slope protection, riprap stone channel protection or riprap stone conduit outlet protection.

# SECTION 617 - TRAFFIC CONTROL

**617.02 Materials.**
THE ENTIRE SUBSECTION IS CHANGED TO:

Materials shall conform to the following Subsections:

Removable Wet Weather Pavement Marking Tape and Removable Black Line Masking Tape..... 912.12
Temporary Pavement Markers..... 912.16

**617.03 Traffic Control Devices.**
THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Traffic Control devices shall be NCHRP-350 crash test compliant by the NJDOT implementation dates stated in the table below and shall be duly certified, if necessary.

| Traffic Control Device Category | Commonly used NJDOT Traffic Control Devices | AASHTO/FHWA implementation date for newly purchased Devices | NJDOT implementation date for newly purchased Devices | NJDOT deadline By which devices must be NCHRP-350 compliant |
|---|---|---|---|---|
| 1 | Traffic cones, drums and delineator guide posts | 10/1/1998 | 1/1/2003 | 8/15/2003 |
| 2 | Vertical panel, portable sign supports, and type III barricades | 10/1/2000 | 1/1/2003 | 8/15/2003 |
| 3 | Truck mounted attenuators and traffic barriers-impact attenuators (crash cushions), barrier terminals, and longitudinal barriers | 10/01/1998 attenuators 10/01/2002 temporary barriers | 10/01/1998 | 3/15/2005 |
| 4 | Portable, usually trailer-mounted, devices such as lighting supports, flashing arrows panels, temporary traffic signals, and changeable message signs used in or adjacent to the traveled way | to be announced | 6/15/2005 | 6/15/2007 |

Note: Resident Engineer's approval shall be obtained to use traffic control devices that are certified NCHRP 350 compliant, but not listed in the table.

Newly purchased devices shall be NCHRP-350 compliant. A list of NCHRP 350 compliant and FHWA approved devices can be found at:

http://www.fhwa.dot.gov/safety/fourthlevel/pro_res_road_nchrp350.htm

NCHRP-350 non-compliant, yet adequately serviceable category 3 traffic control devices, such as truck-mounted attenuators (TMA) purchased prior to 10/01/1998, will be allowed to be used until 03/15/2005 upon submitting new purchase documentation to the Resident Engineer.

3. **Illuminated Flashing Arrows.** The solar powered arrow boards approved for use on projects are:
   a. Work Area Protection – Arrowmaster Model WAAW–15-SB
   b. Solar Technology Inc. – Silent Sentinel
   c. Trafcon Industries Inc. – Model TC1-15S
   d. Protect-O-Flash Inc. – Model No. M-90 (LED bulbs only)
   e. TRACOM (Trailer Component Mfg., Inc.)

**617.15 Removable Pavement Marking Tape.**
THE SUBSECTION HEADING AND ENTIRE SUBSECTION ARE CHANGED TO:

**617.15 Removable Wet Weather Pavement Marking Tape.**

Removable wet weather pavement marking tape shall be installed at designated locations and according to the Manufacturer's recommendations. The tape shall be white or yellow and shall be installed in single or double lines, as designated.

The surface upon which the tape is to be installed shall be prepared according to Subsection 618.05. Removable wet weather pavement marking tape shall be installed on dry surfaces, when the surface temperature is between 50 °F and 150 ºF and when the ambient temperature is 50 ºF and rising, and when the weather is otherwise favorable as determined by the Engineer. The tape shall not be overlapped, and only butt splices shall be used.

To ensure maximum adhesion, the tape shall be tamped and a truck shall be driven slowly over the tape several times. The tape shall be removed when no longer required for traffic control.

Removable tape that has become damaged and is no longer serviceable shall be replaced immediately and will not be measured for payment. Tape that is damaged by construction operations shall also be replaced without additional compensation.

**617.16 Method of Measurement.**
THE SIXTEENTH PARAGRAPH IS CHANGED TO:

Removable wet weather pavement marking tape will be measured by the linear foot of 4-inch wide strips, deducting the gaps.

**617.17 Basis of Payment.**
DELETE THE FOLLOWING PAY ITEM:

| *Pay Item* | *Pay Unit* |
|---|---|
| REMOVABLE PAVEMENT MARKING TAPE | LINEAR FOOT |

ADD THE FOLLOWING PAY ITEMS:

| *Pay Item* | *Pay Unit* |
|---|---|
| REMOVABLE WET WEATHER PAVEMENT MARKING TAPE | LINEAR FOOT |

# SECTION 618 - TRAFFIC STRIPES AND MARKINGS

**618.01 Description.**
THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Removal of pavement reflectors and castings consists of the removal and disposal of existing raised pavement markers, including the lense when still intact.

Removal and replacement of pavement reflector lenses consists of the removal of existing pavement reflector lenses and installing new mono–directional or bi–directional pavement reflector lenses.

**618.03 Equipment.**
THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

The epoxy resin striping and liquid system striping equipment shall be so designed, equipped, maintained, and operated that the material is properly applied in variable widths at a consistent temperature. The striping equipment shall include a tachometer and a pressure gauge and a calibrated holding vessel for each component. The holding vessels for all pigments and hardeners shall have thermometers for measuring the temperature of the vessel contents. The striping equipment shall be equipped with a separate power unit for the pumps used in the mixing and distribution of the components. The following shall be furnished with each striping equipment:

1. A calibration sheet that shows the number of the truck body, the capacity thereof, and an outage table in increments of not over ½ inch. This calibration sheet must be certified by the manufacturer or testing agency.
2. A metal rod for each holding vessel, with accurate divisions marked and consecutively numbered starting at the bottom. The rod shall be not less than 1 foot longer than the depth of the vessel.
3. Slip-proof steps with handrail to reach ground level.
4. Slip-proof catwalk with handrail, running along the top of the vessel.
5. Fire extinguisher in working order.

The equipment for applying thermoplastic material shall be capable of providing continuous mixing and agitation of the material. The parts of the equipment conveying the material between the main reservoir and the shaping die shall be so constructed to prevent accumulation and clogging. The mixing and conveying parts and the shaping dies or spray gun shall be capable of maintaining the material at optimum plastic temperature. The equipment shall be so constructed to ensure continuous uniformity in the dimensions of the entire stripe or marking. The kettle provided for the melting and heating of the thermoplastic material shall be equipped with an automatic thermostat control device and heated by a controlled heat-transfer liquid rather than by a direct flame. The heating kettle and applicator shall be equipped and arranged to meet the National Board of Fire Underwriters and State and Federal regulations. The parts of the equipment that come in contact with the material shall be easily accessible for cleaning and maintenance.

All equipment for applying traffic stripes or traffic markings shall be equipped with glass bead dispensers of a type that will mechanically and automatically dispense beads uniformly on wet stripes or markings at the rates specified.

Equipment for removing the various types of traffic stripes or traffic markings shall be designed with a vacuum system to remove all millings from the pavement surface and prevent airborne residue from escaping into the atmosphere.

All equipment including traffic marking tape applicator and retrometer shall be duly calibrated and shall conform manufacturer’s requirements.

**618.04 Determination of Acceptability.**
THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

The Contractor shall furnish for approval, 20 calendar days before placement, a complete schedule of operations for applying pavement markings, including the number and types of equipment, and procedures for the Project.

When long-life traffic stripes are required on the Project, the Contractor shall furnish the manufacturer’s written instructions for proper use of the materials, including but not limited to, mixing ratios and application temperatures.

The Contractor shall arrange for and have each long-life material manufacturer’s representative on the site for the first full day of applying either long-life traffic stripes or traffic markings to provide technical assistance.

The Contractor shall furnish a LTL-2000 Retrometer for the Engineer's use in determining the retroreflectance values of the various traffic stripes or traffic markings. This equipment is for the sole use of the Engineer and will become the property of the Contractor after Acceptance.

Before starting long-life traffic striping operations, the Contractor shall construct one or more test strips. Each test strip shall consist of approximately 500 linear feet of pavement with white and yellow striping (lane and edge lines) or markings similar to that required for the Project. The test strips shall demonstrate the capability of the proposed materials, equipment, and procedures to produce long-life traffic stripes that comply with the Specifications, including dimensions, appearance (stripes with uniform color and crisp, well defined edges), wet film thickness, drying time, adhesion, and glass beads application and retention. A test strip will be required for each applicator equipment used. Additional test strips may be required when major equipment repairs or adjustments are made or when the traffic stripes fail to comply with the Specifications. Permission to proceed with the striping operations will be given when the test strips are in compliance. Each test strip may remain in place and become part of the finished stripes subject to the requirements of Subsection 618.10.

**618.05 Surface Preparation.**
THE SECOND PARAGRAPH IS CHANGED TO:

The Contractor shall apply a primer-sealer conforming to NJDEP volatile organic content (VOC) requirements to the areas of HMA and portland cement concrete surfaces as required, in accordance with the striping manufacturer's recommendations.

THE FOLLOWING IS ADDED:

The bridge deck shall be cleaned or powerwashed to remove any concrete laitance, dirt, oil or other impurities that might prevent the striping from adhering to the deck surface.

**618.07 Long-Life Epoxy Resin Traffic Stripes.**
THE SUBSECTION HEADING AND TEXT ARE CHANGED TO:

**618.07 Long-Life Traffic Stripes.**

The Contractor shall mix epoxy resin material with an automatic proportioning and mixing machine and hot-spray the compound at a temperature between 100 and 130 ºF onto thoroughly dry surfaces. The material shall only be placed during anticipated dry weather when the ambient temperature is a minimum of 45 ºF and the surface temperature is a minimum of 50 ºF. The temperature of the sprayed mixture shall be adjusted as required for prevailing conditions, including the air and pavement surface temperatures, to achieve a no-track drying time of 30 minutes or less. The epoxy resin mixture shall be applied in a wet film thickness of 20 ± 1 mil.

Immediately after, or in conjunction with the epoxy resin application, the Contractor shall apply large glass beads and small glass beads to the wet compound. Each type of bead shall be applied in a uniform pattern and each at a rate of 12 pounds per gallon of epoxy resin material.

The Contractor shall remove all epoxy resin material that has been tracked or spilled in areas outside of the intended placement areas.

Alternate liquid striping materials shall be selected from the approved product list maintained by the Bureau of Materials.

**618.08 Long-Life Thermoplastic Traffic Markings.**
THE SUBSECTION HEADING AND ENTIRE TEXT ARE CHANGED TO:

**618.08 Long-Life Thermoplastic and Preformed Tape Traffic Markings.**

The Contractor shall apply preformed thermoplastic or hot extruded thermoplastic or preformed tape traffic markings, using equipment and procedures that produce markings that are straight and have sharp edges; that are the specified color, width, and thickness; that have uniform retroreflectivity; and that are properly bonded to the pavement. The thermoplastic material shall be applied as follows:

1. **Preformed Thermoplastic.** The Contractor shall place preformed thermoplastic traffic marking tape on thoroughly dry surfaces and during anticipated dry weather. The preformed thermoplastic tape shall be

melted using the flame from a propane-type torch, according to the manufacturer's recommendations, to bond the traffic markings permanently in position.

If required, the Contractor shall apply additional glass beads to the hot-wet material in a uniform pattern, to attain the minimum initial retroreflectance value specified in Subsection 618.10 for thermoplastic tape.

2. **Hot Extruded Thermoplastic.** The Contractor shall heat the thermoplastic material uniformly and apply the melted material at a temperature between 400 and 425 ºF, to thoroughly dry surfaces and during anticipated dry weather, when the ambient and surface temperatures are a minimum of 50 ºF. The thermoplastic traffic markings shall be extruded on the HMA or portland cement concrete pavement in a thickness of 90 ± 5 mils.

   Immediately after, or in conjunction with the thermoplastic application, the Contractor shall apply, by mechanical means, glass beads to the wet material in a uniform pattern and at a minimum rate of 10 pounds per 100 square feet of markings. Hand throwing of the beads will not be allowed.

3. **Preformed tape.** Preformed traffic tape shall be applied according to the tape manufacturer's installation instructions. The use of primers or other adhesion promoting agents shall be used according to the recommendations of the tape and primer/agent manufacturers. Applied stripes and markings shall be free from snaking, air bubbles, loose edges or any other condition that may cause early failure as determined by the engineer.

   Tape shall be applied at least 3 inches away from longitudinal joints. In areas where it is not possible to avoid a joint beneath the tape, such as transverse construction joints, short lengths of longitudinal joints or other pavement depressions and irregularities directly beneath the tape, the tape shall be cut or treated according to the tape or marking manufacturer's recommendations. In no case shall more than two continuous feet of striping tape be placed over a longitudinal joint.

**618.10 Defective Stripes or Markings.**

THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

The Contractor shall replace long-life traffic stripes or traffic markings determined to be in nonconformance with the Specifications, or not placed at the locations or in the dimensions specified. The defective stripes or markings shall be removed according to Subsection 618.12.

The Contractor shall replace defective long-life traffic stripes based on the following:

1. The entire 10 foot broken line if the line to be replaced is determined to have a deficiency.
2. The entire length of epoxy resin striping determined to have a wet film thickness of less than 19 mils shall be restriped with 20 mils of new epoxy resin, based upon the calculated and measured yields.
3. The entire length of striping shall be replaced where improper curing or discoloration has occurred. Discoloration is defined as localized areas or patches of brown or grayish colored epoxy resin material. When improper curing or discoloration occurs intermittently in intervals of 100 feet or less throughout the striping, the entire length of striping shall be replaced from where it first occurs until where it no longer exists plus 5 feet on each end.
4. The entire length of striping that has failed to bond or adhere to the pavement, or has chipped or cracked, shall be replaced from where it first occurs to where it no longer exists. When more than 25 spots (combined or individual) of chipping, cracking or poor bonding/adhesion has occurred within a 1,000 linear foot distance, the entire 1,000 linear feet shall be replaced.
5. The entire length of 1 mile of striping shall be replaced where the initial retroreflectance value of two of four readings for that 1 mile of 4-inch wide striping is not in compliance with the following:
   As measured with a LTL-2000 Retrometer

| **Type** | **White** (Millicandelas per square foot per footcandle) | **Yellow** (Millicandelas per square foot per footcandle) |
|---|---|---|
| Epoxy Resin | 375 | 250 |
| Permanent Tape | 500 | 300 |

6. The entire area of striping shall be replaced where the glass bead coverage or retention is deficient, based on yield determinations made during application and on visual comparisons of the production traffic stripes with those of the test strips.

The Contractor shall replace defective long-life thermoplastic traffic markings based on the following:

1. The entire area of marking determined to be less than the required thickness, to have an incorrect color or width, to have failed to bond to the pavement, or to have chipped or cracked shall be replaced. The minimum replacement area is an individual word or symbol, or entire length of longitudinal line from where the deficiency first occurs to where it no longer exists.
2 The entire area of marking shall be replaced where the initial retroreflectance value is less than 375 millicandelas per square foot per footcandle for white or 250 millicandelas per square foot per footcandle for yellow. Initial retroreflectance will be determined as follows:
   Step 1: Visual night inspections will be made to identify traffic markings that appear to be below the specified minimum value.
   Step 2: All retroreflectance measurements taken with an LTL-2000 retrometer will be made on a clean, dry surface.
   Step 3: a. For word markings, three random retroreflectance measurements will be made on each letter.
   b. For symbols, nine random retroreflectance measurements will be made over the symbol.
   Step 4: All retroreflectance measurements within an area will be averaged to determine if the minimum retroreflectance requirements are met.

At no Additional Compensation to the State, the Contractor shall remove all traffic paint where the striping or markings will not be directly under long-life material, replace long-life traffic stripes or traffic markings damaged due to any sawing or sealing of joints in the HMA overlay, and replace all existing pavement reflectors that have been marred by striping or marking material as a result of improperly located traffic stripes or traffic markings.

**618.12 Removal of Traffic Stripes or Traffic Markings.**
SUBSECTION IS RENAMED AND CHANGED TO:

**618.12 Removal and Replacement of Traffic Delineation Devices.**

**A. Removal of Traffic Stripes, Markings, or Reflectors and Castings.** The Contractor shall remove all types of traffic stripes or traffic markings by methods that do not damage the integrity of the underlying pavement or adjacent pavement areas, and that do not cause gouging, or create ridges or grooves in the pavement that may result in compromising vehicular control. Obliterating stripes or markings by painting over them shall not be permitted.

Before starting removal operations, the Contractor shall demonstrate the proposed method to accomplish the complete removal of the reflectors and castings and the removal of approximately 95 percent of the stripe or marking without the removal of more than 1/16 inch of pavement thickness. Area of removal includes the area of the stripe or marking plus 1 inch on all sides. Removal operations shall not be permitted until the method of removal has been approved.

Debris from the removal of traffic stripes and markings shall be disposed of according to Subsection 201.10.

Disposal of pavement reflectors and castings shall be in conformance with Subsection 201.10.

**B. Removal and Replacement of Pavement Reflector Lenses.** The Contractor shall remove existing pavement reflector lenses and install new mono–directional or bi–directional pavement reflector lenses within the limits of construction or as directed by the Engineer. The reflector adhesive used in the bonding of the reflector lenses to the casting shall be in conformance with Subsection 912.17.

The Contractor shall remove and replace pavement reflector lenses by methods that do not damage the underlying castings.

Disposal of pavement reflectors lenses shall be in conformance with Subsection 201.10.

**618.14 Method of Measurement.**
THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Removal of pavement reflectors and castings will be measured by the number of units.
Removal and replacement of pavement reflector lenses will be measured by the number of units.

**618.15 Basis of Payment.**
THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| REMOVAL OF PAVEMENT REFLECTORS AND CASTINGS | UNIT |

| | |
|---|---|
| REMOVAL AND REPLACEMENT OF PAVEMENT REFLECTOR LENSES | UNIT |
| TRAFFIC STRIPES, LIQUID SYSTEM | LINEAR FOOT |
| TRAFFIC STRIPES, LONG LIFE, PREFORMED TAPE | LINEAR FOOT |
| TRAFFIC MARKINGS, LINES, PREFORMED TAPE | LINEAR FOOT |
| TRAFFIC MARKINGS, SYMBOLS, PREFORMED TAPE | SQUARE FOOT |

## SECTION 619 - SIGNS

**619.03 Regulatory and Warning Signs.**
THE FIRST PARAGRAPH IS CHANGED TO:

Regulatory and warning signs shall be fabricated of flat aluminum sheets and shall be covered with ASTM D 4956 Type III retroreflective sheeting. Legends, borders, and accessories shall be Type B unless otherwise designated. Signs shall be fabricated according to Subsection 916.08.

**619.04 Guide Signs.**
THE FIRST PARAGRAPH IS CHANGED TO:

Guide signs fabricated of extruded aluminum sheets shall be covered with ASTM D 4956, TYPE III, Type VIII or Type IX retroreflective sheeting depending on the following:

1. Guide signs on steel "U" posts shall be fabricated of flat aluminum sheets and shall be covered with ASTM D 4956 Type III retroreflective sheeting. Legends, borders, and accessories shall be Type B unless otherwise designated.
2. Guide signs on overheads and breakaway or non-breakaway posts shall be fabricated of extruded aluminum panels covered with ASTM D 4956 Types VIII or IX retroreflective sheeting. Legends, borders, and accessories shall be Type A.

## SECTION 620 - DELINEATORS

**620.03 Ground Mounted Flexible Delineators.**
THE SECOND PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be pre-applied to the front (surface facing traffic) of the unit by the manufacturer. The retroreflective sheeting shall cover a minimum area of 3 by 12 inches, beginning a maximum of 2 inches from the top of the post. The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

**620.04 Guide Rail Mounted Flexible Delineators.**
THE SECOND PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be applied to the upper portion of the flexible delineator panel. The retroreflective sheeting shall cover a minimum area of 4 ½ by 4 ½ inches (4 ½ by 9 inches for deceleration and acceleration lanes). The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

**620.05 Barrier Curb Mounted Flexible Delineators.**
THE THIRD PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be applied to the upper portion of the flexible delineator panel facing traffic and perpendicular to the top of the concrete barrier curb. The retroreflective sheeting shall cover an area of 3 ½ by 3 ½ inches. The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

## SECTION 622 - WATER, GAS, AND SANITARY SEWER LINES

**622.01 Description**
THE FOLLOWING IS ADDED:

The work shall also consist of the construction of the 8 inch water main, 8 inch ductile iron sewer pipe and 16 inch diameter, ½ inch thick, steel casing pipe.

The work shall also consist of the construction 8" gravity sewer, reconstruction existing manholes, adjusting castings to proposed grade and demolition of existing manhole. All work on sanitary manholes shall be in accordance with Subsection 603.

**622.02 Materials.**
THE FOLLOWING IS ADDED:

1. **Water**

**Pipe.**

Pipe for water main shall be ductile iron, minimum thickness class 52, cement-lined, bituminous seal coat, exterior tar coat, push-on, mechanical joint or T.R. Flex pipe conforming to ANSI/AWWA 151/A21.51, AWWA C-104 and AWWA C-111.

Pipe sizes indicated are nominal pipe sizes.

Casing pipe shall be 16" inside diameter smooth-wall, steel pipe having a minimum yield strength of 35,000psi and a nominal wall thickness of 0.500 inches.

**Valve.**

Gate Valves shall be 200 psi rating, conforming to AWWA C-509. Valve shall be mechanical joint with retainer glands, and shall have a 2" operating nut and shall open counter-clockwise.

All valves shall include accessories (bolts, glands, and gaskets).

**Valve Boxes.**

Valve boxes shall be cast iron, two-piece, slip type, 5 ¼ " diameter shaft. The word "WATER" shall be cast on the cover with a direction arrow pointing in the "OPEN" direction.

**Service Connections.**

Service connections to be Type K soft copper tubing between the corporation and the curb stop. Corporation stops shall conform to AWWA C-800.

**Fittings.**

The pipe fitting shall be cast or ductile iron, cement lined, mechanical joints with retainer glands, 150psi, conforming to AWWA C-110 and/or AWWA C-153, AWWA C-104 and AWWA C-111.

**Hydrants.**

5 1/4" barrel, 2-2 $^{1}/_{2}$" hose connections, 1-4 $^{1}/_{2}$" steamer connection, 1 ½" pentagon operating nut, open counter-clockwise, conforming to AWWA C-502.

2. **Sanitary Sewer**

Pipe for sanitary sewer main shall be ductile iron, minimum thickness class 52, cement-lined, bituminous seal coat, exterior tar coat, push-on, mechanical joint or T.R. Flex pipe conforming to ANSI/AWWA 151/A21.51, AWWA C-104 and AWWA C-111.

Pipe sizes indicated are nominal pipe sizes.

Casing pipe shall be 16" inside diameter smooth-wall, steel pipe having a minimum yield strength of 35,000psi and a nominal wall thickness of 0.500 inches. Casing pipe shall be installed by open cut method.

**622.03 Construction Requirements.**

THE FOLLOWING IS ADDED:

1. **Water**

Construction requirements for ductile iron water pipe shall conform to the requirements of Section 602, ANSI/AWWA C600 Standard for Installation of Ductile Iron Water Mains and Brick Township Municipal Utilities Authority (BTMUA) or the Borough of Brielle including testing and disinfecting. Unless otherwise shown on the Contract Drawings, pipe shall have a minimum cover of four feet unless otherwise approved by BTMUA and/or the Borough.

Casing pipe shall be installed by open cut method.

Place crushed stone bedding and finish the bottom of the trench by hand and compact to support the pipe barrel for its entire length.

Provide holes at bell or mechanical joint locations of the minimum size required to make up the joints.

If groundwater is encountered, prevent its accumulation in the trench bottom by methods approved by the Engineer. No pipe shall be installed if there is water in the trench at or above the level of the bottom of a bell or mechanical joint.

Over-excavation and the use of timber blocking beneath the pipe may be permitted where the groundwater volume is such that in the opinion of the Engineer, the Contractor is unable to maintain groundwater accumulation below the level of the bottom of a bell or mechanical joint.

Prior to their placement in the trench, all pipes, valves, fittings and/or any other pipeline accessories shall be inspected in the presence of the Engineer to verify that they are internally clean and free of damage of the materials, linings and coatings. Damaged units shall be repaired to the satisfaction of the Engineer or removed from the construction site and replaced, all at no additional cost to the State of NJ, BTMUA and/or the Borough. When lowering pipe into the trench and joining the units the interior of the pipeline remains clean.

Thrust blocks are required at all fittings, designed for 150psi test pressure and 2000 lb/sq ft. soil bearing pressure. Thrust block shall be poured of a minimum 3000psi concrete.

Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the conclusion of any work period or interrupted for any reason.

Valves shall be firmly supported upon unexcavated earth or upon a cushion of thoroughly compacted sand, as may be directed by the Engineer. Under no circumstances shall the valves be supported on blocks. They shall be joined to new pipe in the manner as specified elsewhere in these specifications for mechanical joints.

After installation, rods, nuts, bolts, washers, clamps, and other restraining devices, except thrust blocks, shall be cleaned and thoroughly coated with a bituminous or other acceptable corrosion-retarding material.

A polyethylene tubing and tape wrap shall be placed round the pipe effectively bagging each length. Polyethylene film shall be applied loosely but continuously around the pipe with joints sealed by polyethylene adhesive tape. Polyethylene tubing and tape wrap shall be installed in accordance with the manufacturer's specifications and AWWA C105. Care shall be taken in the installation and backfilling operation to prevent tearing the plastic and exposing the pipe.

Water Main Valve Boxes shall be plumb and centered over the valve. They shall be free of silt and debris. The valve boxes shall be set to finish grade and provided with a concrete collar, if situated out of the pavement area. Valve boxes shall be cleaned of asphalt at the seams, pick holes and the surface of the cover.

Fire hydrants bury line shall be set to finish grade. The main nozzle shall be situated perpendicular to the face of the curb. The operating nut shall not be worn, all chains shall be attached to the caps and surrounding area adjusted to the finish grade.

**Interference with Existing Facilities.**

All structures and other facilities encountered shall be protected and supported and if damaged, shall be repaired by the contractor without charge to the State or the owner.

**Flushing and Disinfection.**

Disinfection of the water main shall be done in accordance with the AWWA Standard C651 latest revision," American Water Works Association Standard for Disinfecting Water Mains." Following the application of the chlorine in the installed water main section, the chlorine solution will need to be in contact with the pipe for a minimum period of 24 hours, with chlorine residual reading of 50 parts per million. Upon completion of the 24 hour holding period, a BTMUA and/or the Borough representative shall be scheduled to take chlorine residual samples at various in order to verify the 50 PPM residual. Once approved, a thorough flushing of the newly laid pipe line at its extremities shall be started until the replacement water through its length becomes equal in quality to the BTMUA's and/or the Borough's existing distribution system. All heavily chlorinated water shall be de-chlorinated and properly disposed of as approved by the BTMUA and/or the Borough.

All work of flushing and sterilizing shall be the responsibility of the contractor, and completed under the supervision of a BTMUA and/or the Borough representative. Following the completion of sterilization and flushing, the system shall be isolated and locations along the water main system will be selected by the BTMUA and/or the Borough representative to take bacteriological samples. The first set of samples shall be taken 24-hours following the thorough flushing of the water main system, the second set of samples shall be taken 48-hours from the time of flushing at each selected location. No flushing shall be performed during the bacteriological testing procedure. All samples shall be taken by a representative of a certified testing laboratory, licensed in the State of New Jersey and samples tested for potability. All test results shall be submitted to the BTMUA and/or the Borough representative for determination of acceptability prior to the activation of water main system.

**Pressure Test.**

After completion of the pipeline installation, but prior to final connection to the existing system, Hydrostatic test shall be done in accordance with AWWA Standard C600 and shall be performed under the supervision of the BTMUA and/or the Borough representative. The line shall be completely filled with water under the supervision of a BTMUA and/or the Borough representative, all air expelled and a hydrostatic pressure leakage test performed. The hydrostatic testing should be conducted following the disinfection of the water main system and prior to the bacteriological testing. All piping shall be tested prior to connection with the existing system unless otherwise approved. The contractor shall furnish all labor, material and equipment for performing these tests, including calibrated pressure gauges, test bulkheads, filling of water, drainage and air release connections and valves, calibrated drum measuring for leakage test and test pump. All test water and equipment shall be clean and disinfected.

All portions of the new water main, valves and appurtenances will be tested under an average hydrostatic pressure of 150 pounds per square inch applied at the lowest part of the section of the line under test. The maximum length of pipe to be tested at one time shall not exceed 1000 feet. The pressure shall not be allowed to exceed 160psi or drop below 140psi during the test. Upon reaching the lower pressure limit of 140psi during the time of the test, a portion of the calculated water allowance shall start to be used to maintain the starting pressure between 150 and 160psi. At the end of the test period, the makeup water will be utilized to restore the line to the initial starting pressure. Test leakage will be the total quantity of water utilized to maintain and restore test pressure. Under the foregoing conditions, all visible leaks shall be corrected and the maximum allowable leakage will be determined by the following formula:

$$L = \frac{(S \times D \times P^{0.5})}{133{,}200}$$

Where:

$L$ = testing allowance (makeup water), in gallons per hour
$S$ = length of pipe tested, in feet
$D$ = nominal diameter of the pipe, in inches
$P$ = average test pressure during the hydrostatic test, in psi (gauge)

The duration of the pressure test shall be at least two hours. In the event that the section under test fails to meet the allowable leakage, the contractor shall make all necessary repairs and repeat the test. The test shall be repeated as many times as is necessary to meet allowable leakage specified above.

After the hydrostatic test results have been approved by the Engineer, the water main shall be flushed to remove the chlorinated water and to scour the interior of the pipe. The duration of the flushing shall be determined in the field by the Resident Engineer.

Water mains and appurtenances shall be disinfected. After the hydrostatic test has been performed and approved by the Resident Engineer, the mains shall be thoroughly flushed to remove all dirt and foreign matter and then filled with water containing a dosage of 50ppm of chlorine. The contractor shall avoid cross contaminating existing mains. The chlorinated water shall be retained in the mains for at least twelve hours after which the mains shall be flushed. After flushing, the system shall be filled with water and a bacterial analysis, by an approved laboratory, shall be made. The bacteria test samples shall be taken by the testing laboratory. The results shall meet the standards as set forth by the Department of Environmental Protection of the State of New Jersey.

2. **Sanitary Sewer.**

Construction requirements for sanitary sewer shall conform to the Brick Township Municipal Utilities Authority (BTMUA) or the Borough of Brielle.

A polyethylene tubing and tape wrap shall be placed round the pipe effectively bagging each length. Polyethylene film shall be applied loosely but continuously around the pipe with joints sealed by polyethylene adhesive tape. Polyethylene tubing and tape wrap shall be installed in accordance with the manufacturer's specifications and AWWA C105. Care shall be taken in the installation and backfilling operation to prevent tearing the plastic and exposing the pipe.

**Maintaining Sewage Flows.**

Sewage flow shall be maintained at all times. The contractor is advised that bypass pumping will be required to maintain sewage flows. The contractor shall supply all labor, material, pumps and equipment necessary to maintain sewage flows without causing surcharging in the sanitary sewer system. The bypass system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a (1) one-year rainstorm. The contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypass system. Pump engines shall be equipped with mufflers to minimize noise. When flow in sewer line is plugged, blocked or bypassed, precautions shall be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions shall be taken to insure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved. Connect new sanitary main to existing sanitary main at end of each working day.

**Interference with Existing Facilities.**

All structures and other facilities encountered shall be protected and supported and if damaged, shall be repaired by the contractor without charge to the State or the owner.

**622.04 Method of Measurement.**

THE FOLLOWING IS ADDED:

8 inch Ductile Iron Sewer Pipe, Class 52 will be measured by the linear foot.

16 inch diameter, 1/2 inch thick, steel casing pipe will be measured by the linear foot.

**622.05 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Pay Uni* |
|---|---|
| 8 INCH DUCTILE IRON SEWER PIPE, CLASS 52 | LINEAR FEET |
| 16 INCH DIAMETER, 1/2 INCH THICK, STEEL CASING PIPE | LINEAR FEET |

THE FOLLOWING IS ADDED:

Separate payment will not me made for bypass pumping. The cost to be included in price bid for the sewer pipe.

Separate payment will not be made for cutting, plugging and abandoning water service and all costs shall be included in the various copper water service pipe items.

Separate payment will not be made for demolishing Manhole #14-56, cutting and abandoning the existing sanitary main. All costs shall be included in the lump sum price for the item "Clearing Site"

Separate payment will not be made for providing crushed stone bed, fittings and other incidental appurtenances and all costs shall be included in the bid for the various pipe items.

THE FOLLOWING IS ADDED TO THIS DIVISION:

## SECTION 623 – BRONZE PLAQUE

**623.01 Description.**

This work shall consist of the furnishing and installation of the bronze plaques located on each of the four monuments including all anchoring fixtures where shown on the plan. Mounting method shall be concealed mount.

**MATERIALS**

**623.02 Materials.**

Bronze plaque shall be manufactured by: Flemington Aluminum and Brass, Inc., 24 Junction Road, Flemington, New Jersey 08822 (Contact person: Jean Blackman, Telephone: 908-782-6317), Metallic Arts, 914 North Lake, Spokane, Washington 99212 (Telephone: 1-800-541-3200), Greg Lefevre Studios, 27 Bleeker Street, New York, NY telephone 212-677-1445 or approved equal. Plaque shall be cast of virgin ingots (85-5-5-5 standard U.S. Bronze Alloy). Casting shall be free of pits and gas holes and all letters shall be sharp and hand tooled. Plaque shall be two foot (2') wide by three feet (3') long with a one-inch (1") standard single line border. Picture at top shall be done as a relief. Border and faces of raised letters are to be a smooth finish and raised three-eighths inch (3/8") from background. Background is to be leatherette texture and shall be oxidized. Plaque shall be chemically cleaned and weather-coated with multiple coats of clear acrylic lacquer.

**CONSTRUCTION**

**623.03 Working Drawings.**

Working drawings shall be submitted in accordance with Subsection 105.04 and shall include details of both plaque designs. The contractor shall submit to the Engineer and Landscape and Urban Design Unit telephone number 609-530-5670 for approval the following prior to production of the final bronze plaque:

One sample of each plaque design as indicated below:


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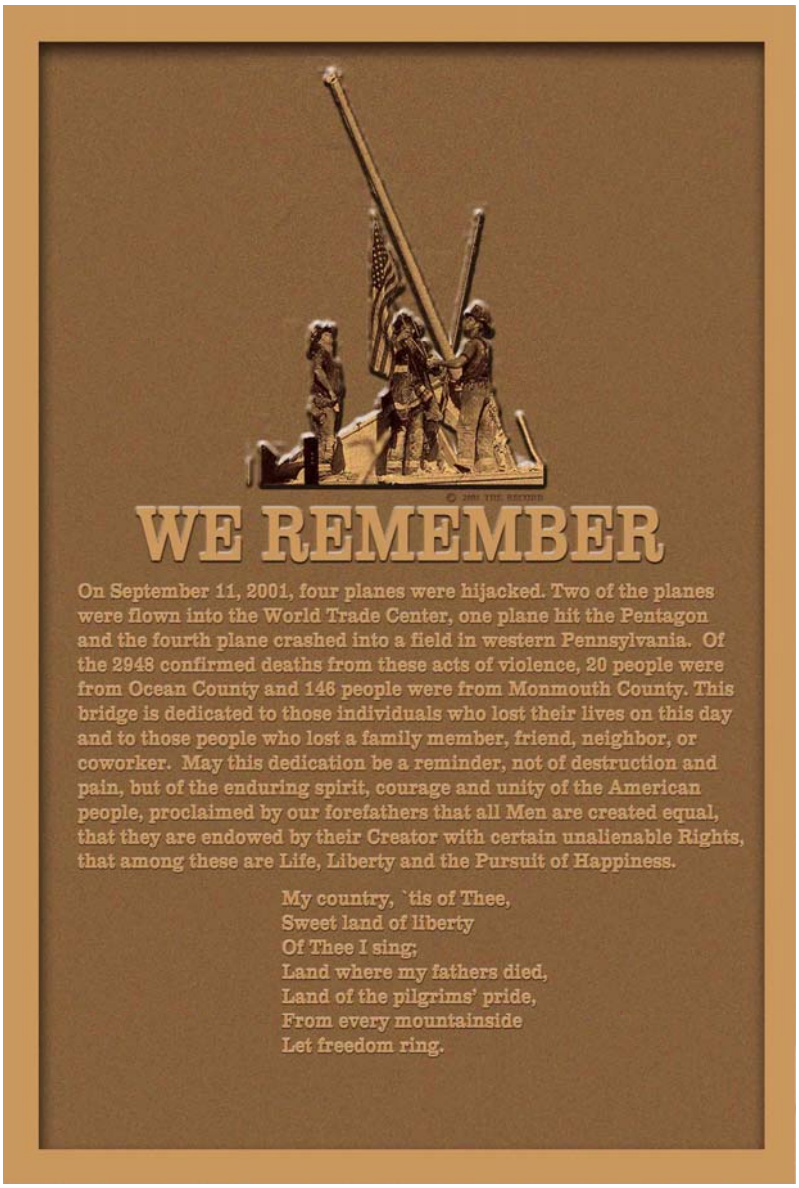
WE REMEMBER
This bridge is dedicated to Monmouth and Ocean County Residents who lost their lives on September 11, 2001. Let these victims be remembered as more than names to their families, friends, neighbors, and coworkers.
Daniel Afflitto
Joao A.D. Aguiar, Jr.
Christopher E. Ailingham
Lorraine D. Antigua
Peter Paul Apollo
Michael G. Arczynski
Louis F. Aversano, Jr.
Brett Bailey
Paul Vincent Barbaro
W. David Bauer, Jr.
Jane S. Beatty
Steven Berger
Donna Bernaerts-Kearns
Timothy D. Betterly
Lawrence F. Boisseau
Alfred J. Braca
Ronald Breitweiser
Edward A. Brennan, III
Patrick Joseph Buhse
Dominick E. Calia
Steven J. Cangialosi
Christopher N. Carter
John Francis Casazza
William Otto Caspar
Jason D. Cayne
Swede Joseph Chevalier
Linda M. Colon
Albert Conde
John E. Connolly, Jr.
Dennis Michael Cook
Delores Marie Costa
Christopher S. Cramer
Brian T. Cummins
Thomas A. Damaskinos
Michael Allen Davidson
James V. DeBlase, Jr.
Edward DeSimone, III
Michael J. D'Esposito
Lawrence P. Dickinson
Michael David Diehl
Patrick J. Driscoll
Michael Egan
Patricia Mary Fagan
Alan Feinberg
Edward Porter Felt
David F. Ferrugio
Stephen J. Fiorelli
Salvatore A. Fiumefreddo
Chih Min "Dennis" Foo
Paul James Furmato
Daniel J. Gallagher
Harvey J. Gardner, III
Salvatore Gitto
John T. Gnazzo
Brian F. Goldberg
Christopher S. Gray
John M. Graszioso
Philip T. Guza
Felicia Hamilton
Frederic K. Han
Stewart D. Harris
Mark F. Hemschoot
Patrick A. Hoey
Frederick Joseph Hoffman
Michele L. Hoffman
Robert Horohoe, Jr.
Thomas F. Hughes, Jr.
Kathleen (Casey) Hunt
Virginia May Jablonski
Howard L. Kane
Paul H. Keating
Robert Clinton Kennedy
James Patrick Ladley
Michael Patrick LaForte
Brendan Mark Lang
Rosanne P. Lang
Ruth Lapin
Anna A. Laverty
John Joseph Lennon, Jr.
Edward Hobbs Luckett II
Christopher E. Lunder
Michael Cameron Lynch
Gregory Malone
Joseph Mangano
James Martello
Charles William Mathers
William A. Mathesen
Robert J. Mayo
James Joseph McAlary, Jr.
Colin Richard McArthur
Michael J. McCabe
Thomas J. McCann
Michael P. McDonnell
Keith D. McHeffey
George P. McLaughlin, Jr.
Edmund M. McNally
William Edward Micciulli
Peter Teague Milano
Louis Joseph Minervino
Joseph John Molisani, Jr.
John G. Monahan
Dennis Moroney
Ferdinand V. Morrone
James Thomas Murphy
John J. Murray
Alfonse J. Niedermeyer, III
Paul R. Nimbley
Edward Kraft Oliver
Robert William O'Shea
Robert E. Parks, Jr.
Steven B. Paterson
Todd Douglas Pelino
Jon Anthony Perconti
Donald Arthur Peterson
Jean Hoadley Peterson
Kaleen Elizabeth Pezzuti
Matthew M. Picerno
Bernard Pietronico
Nicholas P. Pietrunti
Joseph Plumitallo
John M. Pocher
Susan M. Pollio
Gregory M. Preziose
Edward F. Pullis
Beth A. Quigley
Gregory Reidy
John Resta
Sylvia Resta
John Frederick Rhodes
Donald Walter Robertson, Jr.
Carmen Milagros Rodriguez
Richard Rodriguez
Elvin Santiago Romero
Lloyd Daniel Rosenberg
Steven Russin
Joseph Francis Sacerdote
James Sands, Jr.
Susan Lee Kennedy Schuler
Raphael Scorca
Marianne T. Simone
Catherine T. Smith
Karl T. Smith, Sr.
Astrid Elizabeth Sohan
Robert Andrew Spencer
Richard James Stadelberger
Eric A. Stahlman
James J. Straine, Jr.
George Strauch, Jr.
Robert R. Talhami
Lesley Anne Thomas-O'Keefe
Sal E. Tieri, Jr.
Kenneth F. Tietjen
Christopher Traina
Lisa L. Trerotola
Michael P. Tucker
Lance Richard Tumulty
Michael A. Uliano
Anthony Mark Ventura
Wendy A. Rosario Wakeford
Glen James Wall
Brian G. Warner
Michael Henry Waye
Alan Wisniewski
Rodney James Wotton




The list of names shall be verified with the Engineer and Landscape and Urban Design Unit at the time of the submittal. Upon approval of the sample, the Contractor shall produce all plaques indicated in the attachment to the special provisions. All final plaques shall be approved by the Engineer and Landscape and Urban Design prior to installation. Any rejected plaques shall be reproduced and resubmitted to the Engineer.

**623.04 Installation.**

Contractor shall provide shop drawings for installation.

## COMPENSATION

**623.05 Method of Measurement.**

Bronze plaques will be measured by the Unit.

**623.06 Basis of Payment.**

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| BRONZE PLAQUES | UNIT |

## SECTION 624 – ELECTRIC UTILITY

**624.01 Description.**

The work shall consist of the construction of an underground conduit and precast concrete manhole system for the Jersey Central Power & Light Company. The conduit system shall include PVC conduits, support with plastic spacers, concrete encased with a ground wire running along the bottom of the excavation. The location of these facilities is a continuous run from Route 70 Sta. 74+00 to Route 70 Sta. 89+70.

**624.02 Materials.**

Portland cement concrete for encasing the conduit shall be Class C and shall conform to Section 914. Other material shall conform to the following:

Precast concrete manholes to be furnished by Jersey Central Power & Light Co.
Bonding and Grounding Materials…….906.02
Conduits and Fittings……..906.07

Ground wire for Jersey Central Power & Light Co. Shall be No.4/0 AWG, 7 Strand, SD, and shall conform to Subsection 906.02. Plastic Conduit Spacers shall conform to NEMA Standards No. TC-2 – Electric Plastic Tubing (EPT) and Conduit (EPC – 40 and EPC – 80). The Frame and Cover, Manhole, Roadway type shall conform to Jersey Central Power & Light Company Specification No. 15-415 JC. Jersey Central Power & Light Co. specifications are available from Jersey Central Power & Light Co., William L. Uellner, 331 Newman Springs Road, Building 3, Red Bank, New Jersey 07701.

All castings shall be supplied and installed by the Contractor.

**624.03 Construction Requirements**

**A. Manholes.**

All precast manholes shall be placed at a depth such that there is a minimum of 12” cover over the top of the manhole chamber.

The precast manholes shall be placed such that the centerline of the long dimension is in line with the longer entering conduit run.

**B. Conduits.**

Conduits shall be constructed in accordance with the Section 701 and the following:

The concrete encased conduit duct bank shall be constructed in accordance with the dimensions shown on the plans. The concrete used in the duct system shall have a minimum compressive strength of 3000 psi after 28 days.

The conduit system will be constructed of 6” schedule 40 rigid PVC ducts encased in concrete. Ducts shall conform to the requirements of NEMA TC-2 & TC-3; UL 651 and ASTM D2564, latest addition. No steel ducts will be permitted. Precast conduits will not be permitted.

Individual ducts shall be separated by 3” of concrete. A minimum Envelope of 3” of concrete will be placed around ducts. Multiple ducts shall be supported by pre-formed non-metalic separators. No metallic ties or spacers shall be used. No metal parts shall be used in any way which would form magnetic loop.

The ground cover over the conduit will be a minimum of 30” from finished grade to top of concrete in the conduit system.

Conduit generally shall be straight between manholes. The conduit shall be of either constant pitch from one manhole to the next, or crowned only between two manholes. The crown arc length shall not be less than 50’.

The conduit system shall be laid on suitable soil of sufficient bearing strength to prevent settling or shifting.

The ducts shall be mandrelled after the concrete envelope has set.

The Contractor shall pull and leave for Jersey Central Power & Light Company's use a nylon fish line wire in each conduit of sufficient strength to pull a 3/8" line through the conduit.

**C. Inspection.**

The manhole and Duct system is to be inspected and approved by a designated representative of Jersey Central Power & Light Company.

Inspection and approval shall include the following:

Preparation of excavation for all work,
Proper location and placing of manholes,
Spacing and location of conduits and neutral wire in trench and
Straightness and levelness of conduit duct bank.

Jersey Central Power & Light Company is not obligated to have an inspector on the site at all times. Therefore, it becomes the Contractor's responsibility to contact Jersey Central Power & Light Co. to arrange for the job inspection. Contact Mr. William L. Uellner, (732)-212-4246; or Mr. Pat Serpico, (732)-695-5397 to arrange for job inspection.

Acceptance of ownership of the complete duct and manhole system by Jersey Central Power & Light Co. is conditioned upon Jersey Central Power & Light Co.'s ability to properly install its required equipment in the system.

**624.04 Method of Measurement.**

Install Electric Manhole will be measured by the number units of each size installed.

Electric Duct, 10-__" Conduit will be measured by the linear foot of a group of 10 conduits, considered as one unit.

**624.05 Basis of Payment.**

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| INSTALL ELECTRICAL MANHOLE, __' X __' X __' | UNIT |
| ELECTRICAL DUCT, 10-__" CONDUIT | LINEAR FOOT |

No separate payment will be made for concrete encasement, ground wire and fittings and other miscellaneous materials and all costs shall be included in the price bid for the various electrical conduit items.

Payment for 6-6" conduits and 4-6" conduits used for transition will be measured by the linear feet of the longer conduit group and paid as electric duct, 10-6" conduit. No separate Payment will not be made for the shorter conduit group.

# DIVISION 700 - ELECTRICAL

## SECTION 701 – COMMON PROVISIONS

**701.01 Description.**

THE FIRST SENTENCE IS CHANGED TO:

These provisions are common to all work specified in Division 700.

THE FOLLOWING IS ADDED:

Rigid nonmetallic Comcast cable conduit consists of the furnishing and placing of conduit to be used by Comcast for their cable.

**701.02 Materials and Equipment.**

THE FOLLOWING IS ADDED TO THE LIST OF MATERIALS:

Telephone Cable.....906.21

THE WEBSITE IN THE LAST PARAGRAPH IS CHANGED TO:
http://www.state.nj.us/transportation/eng/

**701.03 Existing Systems.**
THE LAST PARAGRAPH IS CHANGED TO:

Before starting work on existing electrical facilities, the Contractor shall provide notification as specified in Subsection 105.09 and arrange a meeting with the Department if requested to verify the proper operation of the existing facilities. The Contractor shall document the resolutions of any meetings and forward a written summary to the Resident Engineer and all attendees.

**701.04 Working Drawings.**
THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

Furnish, as specified in Subsection 105.04, certified working drawings for all non pre-approved electrical materials and equipment, and approved working drawings as specified. The Department will allow the use of pre-approved materials provided the materials meet all requirements of the Contract. The current pre-approved materials list is available on the web site specified in Subsection 701.02. The Contractor shall submit a list of all pre-approved materials to be used for the duration of the Project with the initial Materials Questionnaire Forms as specified in Subsection 106.01.

As specified in Subsection 701.10, approval of the working drawings for the precast foundations or junction boxes shall only apply to the locations designated.

Other certified or approval working drawings shall be submitted as specified.

**701.07 Conduits.**

THE FOLLOWING IS ADDED AFTER 7TH PARAGRAPH:

Rigid Metallic conduit type exposed, for mounting on the fender under the bridge, shall be hot dipped galvanized steel conduit with a 40 mil thick PVC exterior coating and a 2 mil thick urethane interior coating. The exterior PVC coating shall conform to ASTM specifications D870, D1151 and D2247. The interior urethane coating shall conform to ASTM specifications D3359 and D1308. Conduit shall also conform to NJDOT Standard Specifications for Road and Bridge Construction, section 906.07.2. Conduit shall be type 'Plasti-Bond Redhot", as manufactured by Robroy Industries, or approved equal.

THE FOLLOWING IS ADDED:

The handhole for the Comcast cable conduit shall provide a usable working area for providing a large splice enclosure and shall be approved by Comcast for its intended purpose.

**701.19 Method of Measurement.**

THE FOLLOWING IS ADDED:

Telephone Cable will be measured by the linear foot.

**701.20 Basis of Payment.**

THE FOLLOWING PAY ITEMS ARE ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| TELEPHONE CABLE,_____PAIRS NO. _____ AWG | LINEAR FOOT |
| ___" RIGID NONMETTALLIC COMCAST CABLE CONDUIT | LINEAR FOOT |

No separate payment will be made for the handholes for the Comcast Cable conduit and all costs shall be included in the price bid for the item "___" Rigid Metallic Comcast Cable Conduit".

## SECTION 702 – TRAFFIC SIGNALS

**702.02 Materials and Equipment.**

**1. Assembly.**

THE FOLLOWING IS ADDED:

Controller cabinet shall be furnished with a 12 inch high cabinet skirt to elevate the cabinet above the foundation. The cabinet skirt shall be fabricated of the same material and shall be obtained from the same manufacturer as the controller cabinet. The bolt pattern of the cabinet skirt shall match the new controller foundation on which it is to be installed and the controller cabinet which will be mounted above it.

**702.06 Method of Measurement.**

THE FOLLOWING IS ADDED:

Twelve (12) inch cabinet skirt shall be measured by the number of units.

**702.07 Basis of Payment.**

THE FOLLOWING PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| 12 INCH CABINET SKIRT | UNIT |

# SECTION 703 – HIGHWAY LIGHTING

**703.01 Description.**

THE FOLLOWING IS ADDED:

The Banner Bracket shall consist of the furnishing and installation of the wind release banner saver brackets.

**703.02 Materials and Equipment.**

THE FOLLOWING IS ADDED:

Bridge Navigation Lighting Assemblies: Bridge Navigation Lighting Assemblies shall consist of furnishing and installing of Automatic Power, Inc. model number FA-230 Swivel Suspension Arm with FA-143079 Marine Signal Lantern with LED lamp, and two No. 12 AWG color coded wires extending from the terminals of the lantern to the distribution wire in the nearest junction box. The LED shall be of red or green color as noted on the plans.

Fender Navigation Lighting Assemblies: Fender Navigation Lighting Assemblies shall consist of furnishing and installing of Automatic Power, Inc. model number FA-229 Pedestal with FA-143079 Marine Signal Lantern with LED lamp and two No. 12 AWG color coded wires extending from the terminals of the lantern to the distribution wire in the nearest junction box. The LED shall be of red color.

THE FOLLOWING IS ADDED TO THE TABLE:

| Type | Nominal Arm Length Length | Arms | Luminaires | Lamp Size |
|---|---|---|---|---|
| L-8-40-CF-A | 8 | 1 | 1 | 100W-HPS |

**703.03 Materials.**

THE FOLLOWING IS ADDED:

Banner brackets shall be Banner Saver Pro 2000 as manufactured by Colonial Flag, 9390 S. 300 W, Sandy, Utah 84070 Telephone 1-877-935-3524 or approved equal. Banner bracket shall be heavy-duty two-piece cast aluminum base with spring tension assembly and thirty-two inch (32") removable fiberglass banner arm and pin.

**703.04 Construction Requirements.**

THE FOLLOWING IS ADDED:

Installation of the banner bracket shall be in accordance with the manufacturer's directions.

**703.06 Method of Measurement.**

THE FOLLOWING IS ADDED:

The banner bracket will be measured by the number of units.
Bridge Navigation Lighting Assemblies will be measured by the number of units.
Fender Navigation Lighting Assemblies will be measured by the number of units.

**703.07 Basis of Payment.**

THE FOLLOWING PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| BANNER BRACKET | UNIT |
| BRIDGE NAVIGATION LIGHTING ASSEMBLIES | UNIT |
| FENDER NAVIGATION LIGHTING ASSEMBLIES | UNIT |

## SECTION 706 - INTELLIGENT TRANSPORTATION SERVICES FACILITIES

**706.01 Description.**

1. **4-1¼" Rigid Non-Metallic Conduits, Type BS.** 4-1¼" Rigid Non Metallic Conduits, Type BS shall include, but not limited to, excavation, furnishing and installing 4-1¼" rigid non metallic schedule 80 conduits, in a rehabilitated/reconstructed concrete or bituminous shoulder, traveled way or ramp area, furnishing and installing one #14 AWG conductor type THHN/THWN in one conduit, backfilling, compaction and replacement of pavement in accordance with the ITS Detail Sheet.

2. **4-1¼" Rigid Non-Metallic Conduits, Type BC.** 4-1¼" Rigid Non Metallic schedule 80 Conduits, Type BC shall include, but not limited to, cutting the trench in berm, grassy or dirt area, excavation, furnishing and installing one #14 AWG conductor type THHN/THWN in one conduit, backfilling, compaction and restoration of surface conditions in accordance with the ITS Detail Sheet.

3. **CCTV Camera Standard Assembly.** CCTV Camera Standard Assembly shall consist of furnishing and installing a complete CCTV camera assembly system, at location shown on the plans. CCTV camera standard assembly shall consist of camera standard pole, CCTV camera, zoom lens, environmental enclosure, PTZ mounting, control receiver, video transmitter, data transceiver, and all miscellaneous hardware and incidental components required to deliver a fully operational system and conduct all necessary tests required to assure that all systems are operational. CCTV Camera Standard Assembly also includes Traffic Operations Center South Modifications which consists of furnishing and installing equipment allowing the CCTV camera to interface with existing monitoring and control systems at the TOCS, and providing all programming of new and existing equipment required for integration. Modifications to the on-time system for the CCTV shall also be provided at Traffic Operations Center South, Trenton and Traffic Operations North.

4. **Weather Station Assembly.** Weather Station Assembly consists of furnishing and installing a fence and a system designed for monitoring and displaying surface, subsurface, and atmospheric conditions at specific locations shown on the Plans.

5. **Pavement Sensors.** Pavement Sensors shall consist of furnishing and installing surface sensors for monitoring roadway conditions as per manufacturer's specifications.

6. **Pavement Sensor Cables.** Pavement Sensor Cables shall consist of furnishing and installing cables to extend the standard cable provided with the Pavement Sensors and Subsurface Temperature Probe to the Weather Station Assembly.

7. **Subsurface Temperature Probes.** Subsurface Temperature Probes shall consist of furnishing and installing subsurface sensors to monitor roadway conditions as per manufacturer's specifications.

8. **Weather Station Foundation.** This work consists of constructing a reinforced concrete foundation for the weather station.

**706.02 Materials and Equipment.**

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

Materials and equipment shall also conform to the plans, Section 701, 702 and 906, and meet all requirements of the applicable NJDOT Electrical Materials Specifications.

Materials for the Weather Station Foundation shall conform to Section 501.

Wiring schematics, working drawings and catalog cuts shall be provided to the Resident Engineer for approval for all contractor-furnished material, equipment, and equipment layouts in accordance with Section 105.04.

Materials and equipment supplied for this project shall be fully operational. The material and equipment shall conform to the following:

**Weather Station Assembly.** Surface conditions to be monitored and displayed include dry, wet, frost, snow, slush, ice and the percentage of deicing chemical present. Atmospheric conditions include air temperature, relative humidity, precipitation, dew point and wind speed/direction. The work shall include site preparation, protection fencing, electrical connections and all other incidentals necessary to complete the installation as indicated on the plans.

A complete weather station is composed of a tower, remote processing unit (RPU) enclosure including backpanel, atmospheric sensors, service disconnect, and all wiring, bonding and grounding required to provide a complete, tested, fully operational system in accordance with plans, approved manufacturer's specifications and requirements set forth in the NJDOT Electrical Material specification EB-MAINT-WSTA-1.

The weather station shall permit the bi-directional exchange of atmospheric and pavement weather data within the existing NJDOT Road Weather Information Systems (RWIS) network and be compatible with RWIS retrieval software. All hardware and software shall operate as follows:

-Pavement surface sensors must detect and send out the surface temperature and condition to an RPU

-Each atmospheric sensor must detect and send out climatic data to the RPU

-The RPU will send data (via RS232 modem) to the Central Station Equipment

-The Central Station Equipment shall receive the data and store it in a database for access by User Interface (UI) software

The RPU shall gather data from all connected sensors, and process, store and transmit this data to the Central Station Equipment when requested by poll. The RPU shall be enclosed in a NEMA 4 lockable aluminum enclosure mounted on a freestanding, non climbable, corrosion resistant aluminum tower. The tower shall be equipped with a lockable fold-over device for ease of servicing the atmospheric sensors.

**Pavement Sensors.** The sensor shall be a single, solid state electronic device installed in the roadway or bridge pavement as shown on the Plans. The sensors shall be constructed of materials that have thermal characteristics similar to common pavement materials and their tops shall approximate the roadway pavement color and texture. The sensors shall be thermally passive and performance shall not be degraded by climatic conditions, traffic impacts or use of ice control chemicals. Each sensor shall be provided with a minimum of 150 feet of cable attached to the sensor. The cables shall be waterproofed and sealed as an integral part of the assembly. Materials and installation for the Pavement Sensors shall conform to NJDOT Electrical Material Specification EB-MAINT-WSTA-1, section 2-1(D).

**Pavement Sensor Cables.** The cables shall be a minimum 6 pair, no. 19 AWG specifically recommended for use with weather station sensors and probes. They shall be installed as indicated on the Plans and as per manufacturer's specifications. The installation of the cable must include only one splice between the sensor/probe and the weather station. All material required for splicing the cables shall be included in the pay item "Pavement Sensor Cables".

**Subsurface Temperature Probes.**. The probes shall be installed directly under the pavement sensor below the roadway surface. Each probe shall be provided with a minimum of 150 feet of cable attached to the probe. The cables shall be waterproofed and sealed as an integral part of the assembly. Materials and installation for the Subsurface Temperature Probe shall conform to NJDOT Electrical Material Specification EB-MAINT-WSTA-1, Section 2-1(F).

**CCTV Camera Standard Assembly.** The CCTV camera shall be a color/black and white camera. The camera's lens and pan/tilt unit shall be wired to a receiver driver control unit mounted in a NEMA weatherproof enclosure mounted on the pole. The video output from the camera and the bi-phase control output from the receiver driver shall be sent to a telephone transceiver, also mounted in the weatherproof enclosure mounted on the pole. The video and control signal from the camera shall be routed by way of telephone line. The encoders/decoders shall be DSL and cable ready and TCP/IP compliant. The CCTV camera assembly shall operate on a 24 volt source, to be provided in the cabinet. The pan/tilt shall be able to handle a load up to 45

pounds. Materials and installation for the CCTV Camera Standard Assembly shall conform to NJDOT Electrical Material Specification EB-CCTV-COLOR except as noted.

Camera standard pole shall be round or polygonal with a minimum of 18 sides, tapered for structural use, constructed from steel conforming to ASTM specification A53 Grade B or ASTM specification A25 Grade 2 with a minimum yield strength of 50 Ksi.

All Structural steel plates shall conform to ASTM A36. The entire unit shall be galvanized as per ASTM A123 after fabrication.

Poles shall consist of a maximum of two individual tapered steel sections with each section a minimum of 16 foot long. Each section shall be free of circumferential welds or slip joints.

Structural design shall conform to current AASHTO standard specifications for structural supports for highway signs, luminaires and traffic signals.

Additional design criteria are as follows:

Weight of camera drive unit – Approximately 100Kips.
V = 80 miles per Hour
CD (Wind Drag Coefficient) = 1.2 (for camera and drive unit)
Minimum Design Horizontal Load = 5Kips
Maximum Horizontal deflection at the top of the pole, completely assembled with CCTV camera and all fixtures attached, due to a 40 miles per hour wind (V), shall not exceed 0.50% of the total shaft height.

Working drawings of the poles and bases, including design calculations, shall be submitted in accordance with subsection 105.04. The Maximum overturning moment of the base shall be clearly identified in the computations. The pole manufacturer shall have AISC shop certification for category Number 1.

All miscellaneous hardware, including nuts, bolts and washers shall be stainless steel conforming to ASTM A320, Grade B8, Class 2, strain hardened. Bolt head and nuts shall be hexagonal.

The following equipment is required for CCTV Camera Standard Assembly:

| EQUIPMENT | QUANTITY |
|---|---|
| CCTV Camera | 1 |
| Motorized zoom Lens | 1 |
| Environmental Housing | 1 |
| Receiver/Driver | 1 |
| Heavy Duty Pan/Tilt | 1 |
| 12 VDC Power Supply | 1 |
| Video/BIDI Data/Video Modem | 1 |
| NEMA Enclosure | 1 |
| Back Panel | 1 |
| Patch Panel | 1 |
| 200-Watt Heater Kit w/Thermostat | 1 |
| Blower Kit (22 CFM, 14 Watt) | 1 |
| Terminal Block | 1 |
| ROFU Surface Single Gang Box | 3 |
| GFCI Receptacle w/cover plate | 1 |
| Duplex Receptacles | 2 |
| Circuit Breakers | 1 |

Traffic Operations Center South Modifications.

The location of all new equipment shall be coordinated with the NJDOT personnel. The new equipment shall consist of a multiplexer with 2-RS232 4 port modules and a video codec package, a port combiner and all wiring, cables and hardware necessary to connect new field devices into the existing systems.

Integration

The new CCTV camera shall be accessible from TOCS, TOCN, and NJDOT Trenton Headquarters through the existing ON Time Traffic Management System utilizing the local and wide area networks. The

contractor shall all protocols and any other information that is required by the system integrator to connect the CCTV to the existing on-time management system.

Telephone Service.

Telephone service shall include obtaining new service and service for the telephone line between the CCTV camera and TOCS. The contractor shall be responsible for monthly service bills until such time as the service is transferred to the NJDOT.

Test Plan.

A test plan is required for integration testing.

Any additional items of material or equipment required for a complete and fully operational CCTV Camera Standard Assembly shall be included.

**706.03 Construction Requirements.**

THE FOLLOWING IS ADDED TO THIS SECTION:

The Provisions of section 701 and Section 702 shall apply unless and until otherwise stated herein.

The contractor shall contact NJDOT authorities having jurisdiction, prior to any construction or testing activities, to arrange access to the sites and coordinate work activities. The contractor shall schedule this work accordingly.

Unless otherwise waived, the Contractor shall submit to the Resident Engineer within 30 days following the Notice to Proceed, detailed specifications, catalog cuts, parts lists, instruction sheets, working drawings, wiring schematics and interconnect drawings of all equipment and materials which he proposes to install. As-built wiring schematics and interconnect drawings shall be supplied to the NJDOT following final acceptance of all ITS facilities.

Care shall be taken so that operation of any existing system or equipment is not compromised in any way. Any damage caused by the contractor to the existing system or equipment shall be repaired at the contractor's expense.

Repairs to the Department electrical installations, including additional requirements for the fiber optic network of the Department and payment for damages that are the contractor's responsibility, shall be as specified in subsection 105.09 E.

**CCTV Camera Standard Assembly**

The contract requires the installation of new CCTV camera and associated equipment at the location shown on the plans. Prior to the start of any work for this task, the contractor shall submit an installation and test plan to the Resident Engineer for approval. These plans shall be submitted to the Resident Engineer for approval thirty (30) days prior to the start of work. The installation procedure and test plans shall include physical inspection, functional and performance readings of the equipment after the equipment installation is completed. The CCTV Camera units and all associated operation and control equipment shall be installed at proposed location. Construction of the foundation shall comply with the details on the plans and these specifications.

For the Camera Standards, all welding that is permitted shall be performed by quality welding operators using the procedures from the latest edition of ANSI/AASHTO/AWSD. 1.5 Bridge welding Code.

All welding shall be done by the shielded metal-arc, flux cored arc, gas metal-arc or submerged-arc processes.

Circumferential seams and longitudinal seams within 6 inches of any circumferential welds shall be complete penetration. Circumferential weld joining base plate and bottom tube section shall be complete penetration. All other welds shall have 60% minimum weld joint penetration.

All full penetration welds shall be inspected with ultrasonics and all other welds shall be visually inspected. If deemed necessary, the weld shall be radiographically tested as directed by the Resident Engineer.

Pole base plates shall be permanently stamped with manufacturer's name, date and pole design number.

Each shipment and its invoice shall have a list of all the parts on that specific shipment. All bolts, nuts and other hardware shall be either boxed or bundled and identified by the packing list.

Once the cameras are installed the Contractor shall complete the approved test plan to verify that all camera equipment (including mounting locations, methods and attachments) is working properly. The Resident Engineer shall be notified five (5) working days prior to all field tests and reserves the right to witness the test. Documentation of all test results shall be provided to the Resident Engineer within thirty (30) working days after the test is completed. The cost to install and if required to disassemble/reassemble equipment, pull cable and all other work or material to provide the camera in proper working order shall be included in the price bid for pay item, "CCTV Camera Standard Assemblies." The calibration, aiming and final setting after installing the CCTV camera and connecting all equipment to the telephone line system shall be performed in accordance with NJDOT Electrical Materials Specification EBM-CCTV-COLOR to meet minimum acceptable installation and operating requirements for this equipment and the system. The contractor shall contact the resident engineer and the NJDOT Traffic Operations Center South to coordinate this work.

**Bonding and Grounding**

CCTV Camera Assembly and pole shall be grounded in accordance with requirements of National Electrical Code and by methods approved by ITS Engineering of NJDOT.

**Instructions, Manufacturer Documentation and Guarantees**

Two sets of complete schematics and maintenance manual of the equipment shall be supplied with each type of equipment furnished. The maintenance manual shall include complete sub-component parts listings.

System Documentation shall be supplied by the contractor in Microstation CADD format or AutoCAD format with the permission of ITS Engineering. System Documentation shall include CADD drawings for the following:

Equipment Layout

System Block Diagram

All wiring diagrams for various subsystems

Catalog cuts and manufacture information for camera standard pole and all equipment.

All system components shall have three year manufacturer's warranties from the date of acceptance.

**Special Testing and Acceptance**

Prior to purchasing the camera control/receivers, the contractor shall arrange a demonstration of the proposed camera control/receiver working with the CCTV computer and CCTV computer software. The proposed control/receiver shall be in the same room with CCTV computer and be connected to it. The contractor shall demonstrate that camera control/receiver and CCTV computer work reliably together and offer all the control features required by these provisional specifications. Only after the state approves control/receiver based on this demonstration shall the contractor purchase and install the camera control/receivers.

The contractor shall also demonstrate that the CCTV is compatible with the existing system.

**Traffic Operations Center South Modifications.**

This work requires the installation of communication equipment within the TOCS facility in Cherry Hill, New Jersey. The work shall also include the integration of CCTV camera into the existing monitoring and control systems at the facility and operational testing of each device through the existing On Time and MIST operating systems at TOCS. Existing systems may only be taken offline between the hours of 8:00 PM and 4:00 AM in accordance with subsection 108.20 and notification must be provided to the NJDOT 14 days before beginning any work at TOCS. Wiring schematics, interconnect drawings and working drawings showing the layout of new equipment shall be prepared as outlined in subsection 701.04 and submitted to the Resident Engineer for review and approval by the NJDOT-Bureau of ITS Engineering.

The contractor shall develop a test plan for all the systems being affected that shall include list of tests to be performed, test schedule, personnel assignments and equipment to be tested. The test plan shall be submitted to the Resident Engineer for review and approval at least 30 days prior to the scheduled date of the start of the tests. The test plan shall, as a minimum, contain the requirements for test initiation, the test objective, success criteria, test description, test conditions, test data requirements, test equipment/facilities, methodology, data collection/analysis, discrepancy notation and tracking, action(s) taken to correct discrepancies, re-test data and criteria for successful exit from the test.

The Resident Engineer will approve or request modifications to the test plan and all test forms to be used within fifteen (15) days of the Contractor's submittal. The installation test will not be authorized to start

without the approval of the test plan and forms. The Resident Engineer, or his designee, shall be invited to monitor all the tests. Any failure shall be documented and repairs be made to the satisfaction of the Resident Engineer.

**Weather Station Assembly**

This work requires the installation of a tower on a concrete foundation, protective fencing and all sensor and monitoring equipment on the station tower. All equipment shall be installed as detailed on the Plans and conform to NJDOT Electrical Materials Specification EB-MAINT-WSTA-1. Wiring schematics and working drawings showing the layout of equipment shall be prepared as outlined in Subsection 701.04 and submitted to the Resident Engineer for review and approval by the NJDOT-Bureau of ITS Engineering.

Prior to the start of any work for this task, the contractor shall also submit an installation procedure and test plan to the Resident Engineer for approval. The installation procedure and test plans shall include all weather station equipment including the pavement sensors, subsurface probes and all associated cabling. Items to be covered include physical inspection, and functional and performance readings of the equipment after equipment installation is complete. The Resident Engineer shall be notified five (5) days prior to all field tests and reserves the right to witness the test. Documentation of all test results shall be provided to the Resident Engineer within thirty (30) days after the test is completed. The cost to install and if required to disassemble/reassemble equipment, pull cables and all other work or material necessary to provide the assembly in proper working order shall be included in the price bid for Pay Item, "Weather Station Assembly".

**Pavement Sensors, Subsurface Probes and Sensor Cables**

This work requires the installation of pavement sensors, subsurface temperature probes and all associated cables. These roadway devices shall be connected to the Weather Station RPU and installed in a manner that conforms to NJDOT Electrical Material Specification EB-MAINT-WSTA-1.

Pavement Sensors shall be sealed with an epoxy sealer, supplied by the manufacturer, so the top is flush with the surrounding roadway surface and does not allow moisture to enter the pavement structure. Subsurface temperature probes shall be installed directly under the pavement sensor below the roadway surface. Pavement sensor cables shall be waterproofed and sealed as an integral part of the assembly.

The installation procedure and testing of the roadway weather devices shall be included in the price bid for Pay Item, "Weather Station Assembly."

**706.04 Method of Measurement.**

THE FOLLOWING IS ADDED:

4-1¼" Rigid Non Metallic conduits of various types will be measured by the linear foot of the group of conduits.
Pavement sensor cable including slack will be measured by the linear foot.
Pavement sensors will be measured by the number of units.
Subsurface temperature probes will be measured by the number of units.
CCTV Camera standard assembly will be measured by the number of units.
All foundations will be measured by the number of units.
The Weather station assembly will be measured on a lump sum basis.

**706.05 Basis of Payment.**

THE FOLLOWING ITEMS ARE ADDED:

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| 4 –1¼" RIGID NON-METALLIC CONDUIT, TYPE___ | LINEAR FOOT |
| WEATHER STATION FOUNDATIONS | UNIT |
| WEATHER STATION ASSEMBLY | LUMP SUM |
| PAVEMENT SENSORS | UNIT |

| | |
|---|---|
| PAVEMENT SENSOR CABLE | LINEAR FOOT |
| SUBSURFACE TEMPERATURE PROBE | UNIT |
| CCTV CAMERA STANDARD ASSEMBLY, TYPE _____ | UNIT |

Payment for ground wire, service wire, telephone cables, conduits, junction boxes, foundations and meter cabinets will be made in accordance with Section 701.

No separate payment will be made for the telephone connection charges and monthly telephone service charges and all costs whall be included in the price bid for the item "CCTV Camera Standard Assembly. Type__"

Separate payment will not be made for trace wire installed in communication conduits, but all costs thereof shall be included in the bid for communication conduits of various types.

Separate payment will not be made for system integration and testing, factory tests, installation tests and acceptance tests or any other tests. These costs shall be included in the pay item for each device or assembly.

Separate payment will not be made for instructions, manufacturer's documentation and guarantees.

Separate payment will not be made for grounding, bonding and ground testing.

Separate payment will not be made for modifications to Traffic Operations Center South. All costs shall be included in the pay item, "CCTV Camera Standard Assembly, Type___."

Separate payment will not be made for removal of existing junction boxes, trace wire etc., and all costs thereof shall be included in the lump sum price bid for the Pay Item "Clearing Site."

Separate payment will not be made for the CCTV camera set up and all costs shall be included in the price bid for pay item "CCTV Camera Standard Assemblies. Type ___".

THE FOLLOWING IS ADDED TO THIS DIVISION:

# SECTION 707 – EMERGENCY BACKUP GENERATOR

**707.01 Description.**

It is the intent of this specification to secure on a temporary bases, an engine driven generator set to match performance and control equipment of the existing unit. The generator set that has been prototype tested, factory built, production tested, and site tested, together with all accessories necessary for a complete installation and operation as shown on the plans and drawings and specified herein. All equipment shall be new and of current production by an international firm which manufactures the generator and controls.

The work will also include constructing the timber platform for the generator.

## MATERIALS

**707.02 Materials.**

Timber shall conform to Subsection 506.02

## EQUIPMENT

**707.03 Equipment.**

The equipment for the timber platform shall conform to Subsection 506.03

**707.04 General Requirements**

It is the intent of this specification to secure a generator system that has been tested during design verification, production and at the final job site. The generator set will be of the lasted commercial design and will be complete with all of the necessary accessories for complete installation as shown on the plans, drawings, and specifications herein. The equipment supplied and installed shall meet the requirements of the National Electrical Code, along with all applicable local codes and regulations. All equipment shall be new and of current production of a national firm which manufactures the generator and controls, transfer switches, switchgear, and assembles the generator sets as a complete and coordinated system. There will be one source responsibility for warranty, parts, and service through a local representative with factory-trained servicemen.

The contractor shall examine the existing generator condition in accordance with the requirements of Section 102.06.

**707.05 Submittal**

The submittal shall be in accordance with subsection 105.04 and shall include prototype test certification and specification sheets showing all standard and optional accessories to be supplied, schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number, each required interconnection between the generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these specifications.

The generator set shall conform to the requirements of the following codes and standards:

CSA C22.2, No. 14 – M91 Industrial Control Equipment.

EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.

EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.

IEC8528 part 4. Control Systems for Generator Sets

IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.

IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

Mil Std 461D –1993. Military Standard, Electromagnetic Interference Characteristics.

Mil Std 462D - 1993. Military Standard, Measurement of Electromagnetic Interference Characteristics.

NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.

NFPA99 – Essential Electrical Systems for Health Care Facilities

NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.

UL2200. The genset shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed

**707.07 Testing.**

To assure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and/or local representative shall be responsible for three separate tests: design prototype tests, final production tests, and site tests.

1. **Design Prototype Tests:** Components of the emergency system such as the engine/generator set, transfer switch, and accessories shall not be subjected to prototype tests since the tests are potentially damaging. Rather, similar design prototypes and preproduction models, which will not be sold, shall have been used for the following tests.

   Maximum power (kW).

   Maximum motor starting (kVA) at 35% instantaneous voltage dip.

   Alternator temperature rise by embedded thermocouple and/or by resistance method per NEMA MG1-22.40 and 16.40.

   Governor speed regulation under steady-state and transient conditions.

   Voltage regulation and generator transient response.

   Fuel consumption at 1/4, 1/2, 3/4, and full load.

   Harmonic analysis, voltage waveform deviation, and telephone influence factor.

   Three-phase short circuit tests.

   Alternator cooling air flow.

Torsional analysis to verify that the generator set is free of harmful torsional stresses.

Endurance testing.

2. **Production Tests**

Final Production Tests: Each generator set shall be tested under varying loads with guards and exhaust system in place. Tests shall include:

Single-step load pickup.

Transient and steady—state governing.

Safety shutdown device testing.

Voltage regulation.

Rated Power @ 0.8 PF

Maximum Power.

Upon request, arrangements to either witness this test will be made, or a certified test record will be sent prior to shipment.

3. Site Tests

Site Tests: An installation check, start-up, and building load test shall be performed by the manufacturer's local representative. The engineer, regular operators, and the maintenance staff shall be notified of the time and date of the site test. The tests shall include:

Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental conditions present and expected.

Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery charger, generator strip heaters, remote annunciator, etc.

Start-up under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and frequency, and phase rotation.

Automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. Engine coolant temperature, oil pressure, and battery charge level along with generator voltage, amperes, and frequency shall be monitored throughout the test. An external load bank shall be connected to the system if sufficient building load is unavailable to load the generator to the nameplate kW rating.

**707.08 Warranty & Maintenance**

A one year warranty for the generator set shall be included to guarantee against defective material and workmanship in accordance with the manufacturer’s published warranty from date of acceptance.

The generator set manufacturer and its distributor shall maintain a 24-hour parts and service organization. This organization shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment similar to that specified. A service agreement shall be available and shall include system operation

under simulated operating conditions, adjustment to the generator, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and proper functioning of all systems.

**707.09 Equipment.**

The specifications provided herein are offered as a guide, the contractor directed to investigate and verify existing generator characteristics.

The generator set shall be a Kohler model 80REOZJB with a 4S9 generator. It shall provide 85 kW, 106.25 kVA when operating at 277/480 volts, .8 power factor. The generator set shall be capable of this rating while operating in an ambient condition of 77°F (59.2°C) and 5000 feet above sea level.

The generator set shall be capable of starting motor loads of 320 kVA inrush, with a maximum voltage dip of 35%.

Vibration isolators shall be provided between the engine-generator and heavy-duty steel base

**707.10 Engine**

The 276 cubic-inch-displacement engine shall deliver a minimum of 111 hp at a governed speed of 1800 rpm. The engine shall be equipped with the following:

A mechanical governor capable of +0.33% steady-state frequency regulation.

24 Volt positive engagement solenoid shift-starting motor.

55-Ampere minimum automatic battery charging alternator with solid-state voltage regulation.

Positive displacement, full pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain.

Dry-type replaceable air cleaner elements for normal applications.

Engine-driven or electric fuel transfer pump capable of lifting fuel 3 feet, fuel filters, and electric solenoid fuel shut-off valve.

The turbocharged engine shall be fueled with No. 2 diesel

The engine shall have a minimum of 4 cylinders, and be liquid-cooled by a unit-mounted radiator, blower fan, water pump, and thermostats. This system shall properly cool the engine with up to 0.5 inches H20 static pressure on the fan in an ambient temperature up to 122F/50C.

The engine shall be EPA certified

**707.11 Generator**

The alternator shall be salient-pole, brushless, 12-lead reconnectable, self-ventilated of drip-proof construction with amortisseur rotor windings and skewed stator for smooth voltage waveform. The insulation shall meet the NEMA standard (MG1-22.40 and 16.40) for Class H and be insulated with epoxy varnish to be fungus resistant per MIL 1-24092. Temperature rise of the rotor and stator shall be limited to 130°C. The excitation system shall be of brushless construction controlled by a solid- state voltage regulator capable of maintaining voltage within +/- 2% at any constant load from 0% to 100% of rating. The regulator must be isolated to prevent tracking when connected to SCR loads, and provide individual adjustments for voltage range, stability and volts-per-hertz operations; and be protected from the environment by conformal coating.

The generator set shall meet the transient performance requirements of ISO 8528-5, level G-2.

The alternator excitation shall be of a permanent magnet exciter design.

The generator shall be inherently capable of sustaining at least 250% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current support devices.

The generator, having a single maintenance-free bearing, shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.

**707.12 Controller**

Set-mounted controller capable of facing right, left, or rear, shall be vibration isolated on the generator enclosure. The controller shall be capable of being remote-mounted. The microprocessor control board shall be moisture proof and capable of operation from -40$^{o}$C to 85$^{o}$C. Relays will only be acceptable in high-current circuits.

Circuitry shall be of plug-in design for quick replacement. Controller shall be equipped to accept a plug-in device capable of allowing maintenance personnel to test controller performance without operating the engine. The controller shall include the following features:

Fused DC circuit.

Complete 2-wire start/stop control, which shall operate on closure of a remote contact.

Speed sensing and a second independent starter motor disengagement systems shall protect against starter engagement with a moving flywheel. Battery charging alternator voltage will not be acceptable for this purpose.

The starting system shall be designed for restarting in the event of a false engine start, by permitting the engine to completely stop and then re-engage the starter.

Cranking cycler with 15-second ON and OFF cranking periods.

Overcrank protection designed to open the cranking circuit after 75 seconds if the engine fails to start.

Circuitry to shut down the engine when signal for high coolant temperature, low oil pressure, or overspeed are received.

Engine cooldown timer factory set at 5 minutes to permit unloaded running of the standby set after transfer of the load to normal.

3-position (Automatic-OFF-TEST) selector switch. In the TEST position, the engine shall start and run regardless of the position of the remote starting contacts. In the Automatic position, the engine shall start when contacts in the remote control circuit close and stop 5 minutes after those contacts open. In the OFF position, the engine shall not start even though the remote start contacts close. This position shall also provide for immediate shutdown in case of an emergency. Reset of any fault shall also be accomplished by putting the switch to the OFF position.

Alarm horn with silencer switch per NFPA 110.

Standard indicating lights to signal the following shall be included:

Not-in-Auto (flashing red)
Overcrank (red)
Emergency Stop (red)
High Engine Temperature (red)
Overspeed (red)
Low Oil Pressure (red)
Battery Charger Malfunction (red)

Low Battery Voltage (red)
Low Fuel (red)
Auxiliary Prealarm (yellow)
Auxiliary Fault (red)
System Ready (green)

Test button for indicating lights.

Terminals shall be provided for each indicating light above, plus additional terminals for common fault and common prealarm.

**707.13 Instrument Panel**

The instrument panel shall include the following:

Dual range voltmeter 3 1/2-inch, +/- 2% accuracy

Dual range ammeter 3 1/2-inch, +/- 2% accuracy.

Voltmeter-ammeter phase selector switch.

Lights to indicate high or low meter scale.

Direct reading pointer-type frequency meter 3 1/2-inch, 0.5% accuracy, 45 to 65 Hz scale.

Panel-illuminating lights.

Battery charging voltmeter.

Coolant temperature gauge.

Oil pressure gauge.

Running-time meter.

Voltage-adjust rheostat

**707.14 Accessories.**

Line circuit breaker of 250 amperes, 250 amps sensor, 600 volt rated, molded case type, generator mounted.

Engine block heater. Thermostatically controlled and sized to maintain manufacturers recommended engine coolant temperature to meet the start-up requirements of NFPA-99 and NFPA-110, Level 1.

A resettable line current sensing circuit breaker with inverse time versus current response shall be furnished which protects the generator from damage due to its own high current capability. This breaker shall not trip within the 10 seconds specified above to allow selective tripping of down-stream fuses or circuit breakers under a fault condition. This breaker shall not automatically reset, preventing restoration of voltage if maintenance is being performed. a field current-sensing breaker will not be acceptable.

Sound housings shall be as follows:

All enclosures are to be constructed from G60 galvanized high strength, low alloy steel.
The enclosure shall be primed with BASF urethane and finish coated with BASF Superl System paint. Enclosures will be finished in the manufacturer's standard color.

The enclosures must allow the generator set to operate at full load in an ambient of 40°C with no additional derating of the electrical output.

The enclosures must meet all of the requirements of UL-2200.

Enclosures must be equipped with sufficient side and end doors to allow access for operation, inspection, and service of the unit and all options. Minimum requirements are two doors per side. When the generator set controller faces the rear of the generator set, an additional rear facing door is required. Access to the controller and main line circuit breaker must meet the requirements of the National Electric Code.

Doors must be hinged with stainless steel hinges and hardware and be removable.

Doors must be equipped with lockable latches. Locks must be keyed alike.

Enclosures must be mounted to the generator set skid.

The enclosure roof must be pitched to prevent accumulation of water

A duct between the radiator and air outlet must be provided to prevent re-circulation of hot air.

The complete exhaust system shall be internal to the enclosure. Enclosures with roof mounted or externally exposed silencers are not acceptable.

The silencer shall be an insulated critical silencer with a tailpipe and rain cap

All acoustical foam must be fixed to the mounting surface with pressure sensitive adhesive. In addition, all acoustical foam mounted a horizontal plane must be mechanically fastened. The acoustical foam must have a protective film facing to act as a barrier for liquids

The enclosures must include an exhaust scoop to direct the cooling air in a vertical direction

The maximum average sound level shall not exceed 75 dba at 7 meters (23 feet).

Battery rack, and battery cables, capable of holding the manufacturer's recommended batteries, shall be supplied.

12-volt lead-antimony battery(ies) capable of delivering the manufacturer's recommended minimum cold-cranking Amps required at 0oF, per SAE Standard J-537, shall be supplied.

10-Ampere automatic float and equalize battery charger with +/- 1% constant voltage regulation from no load to full load over +/-10% AC input line variation, current limited during engine cranking and short circuit conditions, temperature compensated for ambient temperatures from -40oC to +60oC, 5% accurate voltmeter and ammeter, fused, reverse polarity and transient protected.

Gas-proof, seamless, stainless steel, flexible exhaust bellows with threaded NPT connection.

Two flexible fuel lines rated 300oF and 100 psi ending in pipe thread.

Air cleaner restriction indicator to indicate the need for maintenance of the air cleaners.

Run Relay to provide a three-pole, double-throw relay with 10 amps at 250 VAC contacts for indicating that the generator is running.

Common Failure relay to remotely signal auxiliary faults, emergency stop, high engine temperature, low oil pressure, overcrank, and overspeed via one single-pole, double-throw relay with 10 amps at 120 VAC contacts.

Generator prealarm senders.

Generator rodent guards.

Generator skid end caps.

**707.15 Double Wall Secondary Containment Sub Base Fuel Tank.**

A sub base fuel tank used in conjunction with a diesel powered generator set of 85 kW rating will contain 172 gallons of fuel to support the generator set for a period of 26 hours at 100% of rated load and 33 hours at 75% of rated load.

The sub base fuel system is listed under UL 142, sub section entitled Special Purpose Tanks EFVT category, and will bear their mark of UL Approval according to their particular classification.

The above ground steel secondary containment rectangular tank for use as a sub base for diesel generators is manufactured and intended to be installed in accordance with the Flammable and Combustible Liquids Code—NFPA 30, the Standard for Installation and Use of Stationary Combustible Engine and Gas Turbines—NFPA 37, and Emergency and Standby Power Systems—NFPA 110.

Construction:

Primary Tank.

It will be rectangular in shape and constructed in clam shell fashion to ensure maximum structural integrity and allow the use of a full throat fillet weld.

Steel Channel Support System.

Reinforced steel box channel for generator support, with a load rating of 5,000 Ibs. per generator set mounting hole location. Full height gussets at either end of channel and at generator set mounting holes shall be utilized.

Exterior Finish

The exterior coating has been tested to withstand continuous salt spray testing at 100 percent exposure for 244 hours to a 5 percent salt solution at 92-97° F. The coating has been subjected to full exposure humidity testing to 100 percent humidity at 100° F for 24 hours. Tests are to be conducted in accordance with The American Standard Testing Methods Society.

Venting:

Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks not less than 1-1/4” (3 cm.) nominal inside diameter. A 1 -1/4" atmospheric mushroom cap shall be furnished and the installing contractor shall pipe above the highest fill point as a minimum.

Emergency Venting:

The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank. The wetted area of the tank shall be calculated on the basis of 100 percent of the primary tank. A zinc plated emergency pressure relief vent cap shall be furnished for the primary tank. The vent is spring-pressure operated: opening pressure is 0.5/psig and full opening pressure is 2.5 psig. Limits are stamp marked on top of each vent. The emergency relief vent is sized to accommodate the total venting capacity of both normal and emergency vents.

Fuel Fill:

There shall be a 2" NPT opening within the primary tank with an 8" raised fill pipe and lockable manual fill cap.

Fuel Level:

A direct reading, UL listed, magnetic fuel level gauge with a hermetically-sealed vacuum tested dial shall be provided to eliminate fogging.

Low Fuel Level Switch:

Consists of a 50 watt float switch for remote or local annunciation of a (50% standard) low fuel level condition.

## CONSTRUCTION

### 707.16 Timber Structures.

Construction of the timber platform for the generator shall conform to subsection 506.04.

## COMPENSATION

### 707.17 Method of Measurement.

The Emergency Backup Generator will not be measured, and payment will be made on a lump sum basis.

### 707.18 Basis of Payment.

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| EMERGENCY BACKUP GENERATOR | LUMP SUM |

Payment for emergency backup generator shall include construction of the platform, power cable, connection of power cable to the control panel and all costs thereof associated with the complete and operational system.

# DIVISION 800 – LANDSCAPING

## SECTION 806 – TOPSOILING

**806.01 Description.**

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Subsoil Scarification shall consist of the scarification of subsoil in areas of compacted soils prior to topsoiling, fertilizing and seeding, or planting.

**806.02 Construction Requirements:**

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

The surface area to be subsoil scarified shall be free from all bituminous and concrete pavement, stumps, brush, weeds, and debris. The subsoil shall be scarified to an average depth of 18 inches. Scarified rows shall be parallel and spaced 20 inches on center. The area scarified shall then be bladed smooth prior to topsoiling, fertilizing and seeding, or planting.

Areas that require rescarification prior to acceptance shall be done without additional compensation.

Any damage to vegetation, pavement surfaces, structures, utilities or other property shall be repaired at no cost to the State.

All waste material and debris resulting from subsoil scarification shall be disposed of according to subsection 201.10.

**806.03 Method of Measurement.**

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Subsoil scarification will be measured by the square yard.

**806.04 Basis of Payment.**

THE FOLLOWING PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| SUBSOIL SCARIFICATION | SQUARE YARD |

## SECTION 808 - FERTILIZING AND SEEDING

**808.05 Basis of Payment.**
THE SECOND PARAGRAPH IS CHANGED TO:

Payment will not be made for areas of fertilizing and seeding disturbed by Construction Operations, beyond the prescribed grading limits in islands and medians, and between prescribed grading limits and the right-of-way line, except as follows:

all areas designated for preparation of existing soil as specified under Section 805.

# SECTION 813 – PLANTING

**813.01 Description.**

THE LAST SENTENCE IS DELETED.

**813.03 Construction Requirements.**

**8. Pruning**

THE FIRST PARAGRAPH IS DELETED.

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Pruning of newly planted trees and shrubs shall be limited to the removal of diseased, weak, broken, and interfering branches.

THE FOLLOWING IS ADDED:

Ten (10) working days prior to the commencement of each replacement period a listing of all plantings that shall require replacing will be submitted to the contractor by the Landscape and Urban Design Unit ( phone: 609-530-5670 ).

During the plant establishment period at the aforementioned intervals, all planting beds, hedges and individual plants shall have all weeds sprayed with a herbicide and treated with a pre-emergence herbicide. All plantings shall be provided with sufficient water during the entire establishment period.

All plants that are not alive and healthy at the beginning of each interval period as determined by Landscape and Urban Design Unit, shall be replaced in kind, quantity and size with acceptable live, healthy plants installed as originally specified. Replacements shall include any plantings that were replaced in a previous interval that have become other than alive and healthy. The Landscape and Urban Design Unit reserves the right to allow substitute varieties of plants to be used in its sole discretion.

At each interval, all weeds, debris and damaged plant materials shall be removed and disposed of in accordance with Subsection 201.10. Holes resulting from the theft of plants shall be filled during each replacement interval.

Replacement planting shall conform to the requirements for initial planting except as follows:

1. Existing wood chips shall be removed and may be reused if salvageable and conforming to Subsection 909.04.
2. Backfilling may be made with excavated materials which does not contain wood chips or other objectionable materials.

Replacement of Evergreen materials shall be made from March 1 to May 1 and from August 15 to December 1.

Replacement of Deciduous material shall be made from March 1 to May 1 and from October 15 to December 1.

All stakes, guys and guy wires shall be removed two weeks prior to the conclusion of the 2 year plant establishment period.

When lane or shoulder closures are required during the extended establishment period, these closures shall conform to all the traffic control requirements set forth in the Highway Occupancy Permit.

**813.05 Plant Establishment Period and Replacement.**

THE SUBSECTION HEADING AND ENTIRE TEXT ARE CHANGED TO:

**813.05 Plant Extended Establishment Plan.**

The work shall consist of the replacement of all plants that have been identified as not being alive and healthy at the beginning of each prescribed interval after the plantings have been accepted. The work shall also include weeding, spraying with herbicide, insecticide or fungicides, pruning, repairing and adjusting of guy stakes, the restoration of all areas that are disturbed or damaged during the replacement period and the securing of a Prepaid Maintenance Bond and an approved Highway Occupancy Permit for the entire "Establishment" period. Additionally, insurance requirements listed under subsection 107.23, parts 1, 2 and 4 shall remain in effect for the duration of the "Establishment" period.

The dates for plant acceptance are June 1 for Spring planting and December 1 for Fall planting. No split acceptance will be allowed. Once a date for Plant acceptance has been established by the Engineer the interval for the replacement periods shall be as follows:

June 1 Plant acceptance:

1. August 15 to December 1- replacement period
2. March 1 to May 1 – replacement period
3. August 15 to December 1 – replacement period
4. March 1 to May 1 – replacement period

December 1 Plant acceptance:

1. March 1 to May 1 – replacement period
2. August 15 to December 1 – replacement period
3. March 1 to May 1 – replacement period
4. August 15 to December 1 – replacement period

Plantings will be determined as "Established" two years from the date of acceptance of the initial plantings.

**Materials.**

Reference: Subsection 813.02

**Construction Requirements.**

Reference: Subsection 813.03

THE FOLLOWING INFORMATION MUST BE INCORPORATED INTO THE MT 120A WHERE IT STATES "DESCRIBE PROJECT".

## Permit Description

The work shall consist of the replacement of all plants that have been identified by the Landscape and Urban Design Unit as not being alive and healthy at the beginning of each prescribed interval after the plantings have been accepted. The work shall also include weeding, spraying with herbicide, insecticide or fungicides, pruning, repairing and adjusting of guy stakes and the restoration of all areas that are disturbed or damaged during the replacement period.

Once a date for Plant acceptance has been established by the New Jersey Department of Transportation (NJDOT) Route 70 over Manasquan River, the interval for the replacement periods shall be designated by the NJDOT Landscape and Urban Design Unit as follows:

June 1 Plant acceptance:
August 15 to December 1- replacement period
March 1 to May 1 – replacement period
August 15 to December 1 – replacement period
March 1 to May 1 – replacement period

December 1 Plant acceptance:
March 1 to May 1 – replacement period
August 15 to December 1– replacement period
March 1 to May 1 – replacement period
August 15 to December 1 – replacement period

Plantings will be determined as "Established" two years from the date of acceptance of the initial plantings.

Ten (10) working days prior to the commencement of each replacement period a listing of all plantings that shall require replacing will be submitted to the contractor by the NJDOT Landscape and Urban Design Unit (phone: 609-530-5670).

During the plant establishment period at the aforementioned intervals, all planting beds, hedges and individual plants shall have all weeds sprayed with a herbicide and treated with a pre-emergence herbicide. All plantings shall be provided with sufficient water during the entire establishment period.

All plants that are not alive and healthy at the beginning of each interval period, as determined by the Landscape and Urban Design Unit, shall be replaced in kind, quantity and size with acceptable live, healthy plants installed as originally specified. Replacements shall include any plantings that were replaced in a previous interval that have become other than alive and healthy. The Landscape and Urban Design Unit reserves the right to allow substitute varieties of plants to be used in its sole discretion.

At each interval, all weeds, debris and damaged plant materials shall be removed and disposed of in accordance with Subsection 201.10*. Holes resulting from the theft of plants shall be filled during each replacement interval.

Replacement planting shall conform to the requirements for initial planting except as follows:

1. Existing wood chips shall be removed and may be reused if salvageable and conforming to Subsection 909.04*.

2. Backfilling may be made with excavated materials which does not contain wood chips or other objectionable materials.

Replacement of Evergreen materials shall be made from March 1 to May 1 and from August 15 to December 1. Replacement of Deciduous material shall be made from March 1 to May 1 and from October 15 to December 1.

All stakes, guys and guy wires shall be removed two weeks prior to the conclusion of the 2 year plant establishment period.

When lane or shoulder closures are required during the extended establishment period, these closures shall conform to all the traffic control requirements set forth in the Highway Occupancy Permit, these traffic control requirements are further described as contained in the NJDOT Construction Plans for this project.

The Permittee has been previously compensated for all work described above.

*Refers to the New Jersey Department of Transportation (NJDOT) 2001 Standard Specifications for Road and Bridge Construction.

**813.06 Method of Measurement.**

THE FOLLOWING IS ADDED:

"Extended Plan Establishment", will not be measured, and payment will be made on a Lump Sum basis.

**813.07 Basis of Payment.**

THE FOLLOWING PAY ITEM IS ADDED:

| *Pay Item* | *Pay Unit* |
|---|---|
| PLANT EXTENDED ESTABLISHMENT PLAN | LUMP SUM |

THE FOLLOWING IS ADDED:

Separate payment will not be made for Replacement Plantings but all costs thereof shall be included in the Lump Sum price bid for the item Plant Extended Establishment Plan.

Separate payment will not be made for Watering

Separate payment will not be made for Traffic Control Items.

Separate payment will not be made for the application of herbicides, insecticides or fungicides.

Separate payment will not be made for insurance; all costs of procuring and maintaining required insurance policies and making the State an additional insured as specified, shall be at the Contractor's own expense.

Separate payment for the maintenance bond will not be made. All costs of procuring a maintenance bond as specified shall be at the contractor's own expense.

Separate payment will not be made for overhead and profit nor any other costs incurred by the contractor so as to perform this item; payment for all associated work and costs under this item will be limited to the lump sum payment and will not be adjusted for any reason.

Payment for Plant Extended Establishment Plan will not be made to the Contractor until such time that the Project has reached Substantial Completion (See Subsection 108.10 ) and the Prepaid Maintenance Bond is in place and the Highway Occupancy Permit has been approved by the Department. Said Bond and Permit will remain in effect for the entire Establishment period or until it is determined by the Landscape and Urban Design Unit that they are no longer required. The maintenance bond to be procured by the contractor prior to payment for this item shall be furnished by only those sureties listed in the US Treasury Department Circular 570 and authorized to do business in this State. The bond shall be accompanied by a certification as to authorization of the attorney-in-fact to commit the surety company and a true and correct statement of the financial condition of said surety company. The bond shall be the sum of not less than $100,000.00 and shall be maintained for a period of at least two years from the date of the acceptance of the initial plantings as established by the Engineer. In the event of insolvency of the surety or if the maintenance bond has not been properly authorized or issued by the surety company, the contractor shall furnish and maintain, as above provided, other surety satisfactory to the Commissioner. All work required under this item may be made without the consent of the surety company. The bond shall be furnished on forms supplied by the Department.

THE FOLLOWING SECTION IS ADDED:

# SECTION 815 - SEPTEMBER 11 MEMORIAL SIGN

**Section 815.01 Description.**

This work shall consist of the furnishing and installation of the September 11 Memorial Bridge signs including the cast aluminum sign, the center post mounting hub, the octagonal post, and foundations in areas where shown on the plan.

## MATERIALS

**Section 815.02 Materials.**

Signs shall be a forty-eight inch (48") by forty-two inch (42") rectangle with an eight inch (8") semicircular bump-out and shall be single face cast aluminum (Alloy 43- no junk or remelt) complete with a center post mounting hub, baked enamel or approved equal finish on the background in a leatherette texture and a smooth finish on the raised portions. Casting shall be free of pits and gas holes and all letters shall be sharp with a clean edge. Posts shall be sized to support the sign and shall be an octagonal galvanized steel post with baked enamel finish to match marker background. The panels shall be cast by Lake Shore Industries, Inc. 1817 Poplar Street, P.O. Box 59, Erie, PA 16512-0059 telephone number (800) 458-0463, Flemington Aluminum and Brass, Inc., 24 Junction Road, Flemington, New Jersey 08822 (Contact person: Jean Blackman, Telephone: 908-782-6317), Greg Lefevre Studios, 27 Bleeker Street, New York, NY telephone 212-677-1445 or approved equal.

Other materials shall conform to the following subsections:

Portland Cement.....919.11
Sand.....901.13
Dense-Graded Aggregate.....901.08
Water.....919.15
Reinforcement steel…….915.01

## CONSTRUCTION

**815.03 Working Drawings.**

Working drawings and design calculations shall be submitted in accordance with Subsection 105.04 and shall include sign, center post mounting hub, octagonal post and foundation. The contractor shall submit to the Engineer and Landscape and Urban Design Unit telephone number 609-530-5670 for approval the following prior to production of the final cast aluminum sign:

One full size sample as indicated on the plan sheet indicating the dimensions, color schemes, material, and finish of the final product.

Upon approval of the sample, the Contractor shall produce all signs as indicated on the plan sheet. All final signs shall be approved by the Engineer and Landscape and Urban Design prior to installation. Any rejected signs shall be reproduced and resubmitted to the Engineer.

September 11 Memorial Bridge lettering shall be six-inch (6") capital letters with three-inch (3") lower case letters in the font style Jester. The lettering starting with "In commemoration" shall be one and one half inch (1 ½") capital letters with one-inch (1") lower case letters in the font style Times New Roman.

**815.04 Capacity.**

Design, including loadings, shall conform to the current New Jersey Department of Transportation Design Manual for Bridges and Structures.

**815.05 Installation.**

Sign shall be five feet (5') from top of ground to bottom of sign. Contractor shall provide shop drawings for installation. Installation of sign shall include a poured concrete footing with an imbedded post.

## COMPENSATION

**815.06 Method of Measurement.**

September 11 Memorial Sign will be measured by the number of units.

**815.07 Basis of Payment.**

Payment will be made under:

| *Pay Item* | *Pay Unit* |
|---|---|
| SEPTEMBER 11 MEMORIAL SIGN | UNIT |

No separate payment shall be made for excavation, foundation or mounting of the sign. All costs shall be included in the unit price bid for the item September 11 Memorial Sign.

# DIVISION 900 - MATERIALS

## SECTION 901 - AGGREGATES

**901.08 Dense-Graded Aggregate.**

**C. Production from Mixture with RAP.**

6.

THE SECOND SENTENCE IS CHANGED TO:

When AASHTO T 310 (Direct Transmission Method, nuclear gauge method for measuring density and moisture content) is used to perform Compaction Acceptance Testing (Subsection 301.05, Subpart 2), a representative sample of five tests for each 5,000 square yards lot will be taken.

**901.12 Aggregates for Portland Cenment Concrete, Mortar, and Grout.**

**A. Coarse Aggregate.**

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Coarse aggregate shall be broken stone or washed gravel conforming to Subsection 901.04 or 901.05 respectively except that carbonate rock shall not be used for concrete surface courses or bridge decks.

## SECTION 902 - BEAM GUIDE RAIL

**902.02 Posts and Spacers.**

THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

Suppliers for obtaining recycled/synthetic routed spacers will be identified in the Standard Input. According to the provisions of 105.04, the Working Drawing submission shall provide evidence that the spacers that are to be used do satisfy the above criteria. Steel spacers shall conform to AASHTO M 270 Grade 36 and shall be galvanized according to AASHTO M 111. Steel pipe spacers shall be schedule 40 galvanized pipe.

Wood timber spacers and posts shall conform to Subsection 918.01.

Steel posts shall be structural steel that conforms to AASHTO M 270 Grade 36 and shall be galvanized according to AASHTO M 111.

To verify suppliers for obtaining recycled/synthetic routed spacers (Polymer & Composite Blockouts), the Contractor is advised to study the "Bureau of Material's Approved List" on the following NJDOT website:

http://www.state.nj.us/transportation/eng/technology/materials

## SECTION 903 – HOT MIX ASPHALT

**903.01 Composition of Mixtures.**

For this Project, the 25 percent or less RAP requirements shall govern.

## SECTION 904 – BITUMINOUS MATERIALS

**904.01 Asphalt Binder.**

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Asphalt binder shall conform to AASHTO M320, "Performance-Graded Asphalt Binder".

**904.06 Temperature-Volume Correction Factors.**

SUBSECTION IS CHANGED TO:

Temperature-volume correction factors that shall be used to convert the volume of bituminous materials, measured at the temperature at the point of use, to the volume at 60 ºF are found in the following tables:

**Table 904-1 Temperature-Volume Correction Factors for Bituminous Materials**

Asphalt Binder, All Grades.
Cut-Back Asphalt, Grades RC-800, RC-3000, MC-800, and MC-3000.
Inverted Emulsified Asphalt, Grade IEMC-800.

| Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor |
|---|---|---|---|---|---|---|---|
| 40 | 1.0070 | 85 | 0.9913 | 130 | 0.9758 | 175 | 0.9604 |
| 41 | 1.0067 | 86 | 0.9909 | 131 | 0.9754 | 176 | 0.9601 |
| 42 | 1.0063 | 87 | 0.9906 | 132 | 0.9751 | 177 | 0.9597 |
| 43 | 1.0060 | 88 | 0.9902 | 133 | 0.9747 | 178 | 0.9594 |
| 44 | 1.0056 | 89 | 0.9899 | 134 | 0.9744 | 179 | 0.9590 |
| 45 | 1.0053 | 90 | 0.9896 | 135 | 0.9740 | 180 | 0.9587 |
| 46 | 1.0049 | 91 | 0.9892 | 136 | 0.9737 | 181 | 0.9584 |
| 47 | 1.0046 | 92 | 0.9889 | 137 | 0.9734 | 182 | 0.9580 |
| 48 | 1.0042 | 93 | 0.9885 | 138 | 0.9730 | 183 | 0.9577 |
| 49 | 1.0038 | 94 | 0.9882 | 139 | 0.9727 | 184 | 0.9574 |
| 50 | 1.0035 | 95 | 0.9878 | 140 | 0.9723 | 185 | 0.9570 |
| 51 | 1.0031 | 96 | 0.9875 | 141 | 0.9720 | 186 | 0.9567 |
| 52 | 1.0028 | 97 | 0.9871 | 142 | 0.9716 | 187 | 0.9563 |
| 53 | 1.0024 | 98 | 0.9868 | 143 | 0.9713 | 188 | 0.9560 |
| 54 | 1.0021 | 99 | 0.9864 | 144 | 0.9710 | 189 | 0.9557 |
| 55 | 1.0017 | 100 | 0.9861 | 145 | 0.9706 | 190 | 0.9553 |
| 56 | 1.0014 | 101 | 0.9857 | 146 | 0.9703 | 191 | 0.9550 |
| 57 | 1.0010 | 102 | 0.9854 | 147 | 0.9699 | 192 | 0.9547 |
| 58 | 1.0007 | 103 | 0.9851 | 148 | 0.9696 | 193 | 0.9543 |
| 59 | 1.0003 | 104 | 0.9847 | 149 | 0.9693 | 194 | 0.9540 |
| 60 | 1.0000 | 105 | 0.9844 | 150 | 0.9689 | 195 | 0.9536 |
| 61 | 0.9997 | 106 | 0.9840 | 151 | 0.9686 | 196 | 0.9533 |
| 62 | 0.9993 | 107 | 0.9837 | 152 | 0.9682 | 197 | 0.9530 |
| 63 | 0.9990 | 108 | 0.9833 | 153 | 0.9679 | 198 | 0.9526 |
| 64 | 0.9986 | 109 | 0.9830 | 154 | 0.9675 | 199 | 0.9523 |
| 65 | 0.9983 | 110 | 0.9826 | 155 | 0.9672 | 200 | 0.9520 |
| 66 | 0.9979 | 111 | 0.9823 | 156 | 0.9669 | 201 | 0.9516 |
| 67 | 0.9976 | 112 | 0.9819 | 157 | 0.9665 | 202 | 0.9513 |
| 68 | 0.9972 | 113 | 0.9815 | 158 | 0.9662 | 203 | 0.9509 |
| 69 | 0.9969 | 114 | 0.9813 | 159 | 0.9658 | 204 | 0.9506 |
| 70 | 0.9965 | 115 | 0.9809 | 160 | 0.9655 | 205 | 0.9503 |
| 71 | 0.9962 | 116 | 0.9806 | 161 | 0.9652 | 206 | 0.9499 |
| 72 | 0.9958 | 117 | 0.9802 | 162 | 0.9648 | 207 | 0.9496 |
| 73 | 0.9955 | 118 | 0.9799 | 163 | 0.9645 | 208 | 0.9493 |
| 74 | 0.9951 | 119 | 0.9795 | 164 | 0.9641 | 209 | 0.9489 |
| 75 | 0.9948 | 120 | 0.9792 | 165 | 0.9638 | 210 | 0.9486 |
| 76 | 0.9944 | 121 | 0.9788 | 166 | 0.9635 | 211 | 0.9483 |
| 77 | 0.9941 | 122 | 0.9785 | 167 | 0.9631 | 212 | 0.9479 |
| 78 | 0.9937 | 123 | 0.9782 | 168 | 0.9628 | 213 | 0.9476 |
| 79 | 0.9934 | 124 | 0.9778 | 169 | 0.9624 | 214 | 0.9472 |
| 80 | 0.9930 | 125 | 0.9775 | 170 | 0.9621 | 215 | 0.9469 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 81 | 0.9927 | 126 | 0.9771 | 171 | 0.9618 | 216 | 0.9466 |
| 82 | 0.9923 | 127 | 0.9768 | 172 | 0.9614 | 217 | 0.9462 |
| 83 | 0.9920 | 128 | 0.9764 | 173 | 0.9611 | 218 | 0.9459 |
| 84 | 0.9916 | 129 | 0.9761 | 174 | 0.9607 | 219 | 0.9456 |

**Table 904-1 (Continued)**

| Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor |
|---|---|---|---|---|---|---|---|
| 220 | 0.9452 | 265 | 0.9302 | 310 | 0.9154 | 355 | 0.9008 |
| 221 | 0.9449 | 266 | 0.9299 | 311 | 0.9151 | 356 | 0.9005 |
| 222 | 0.9446 | 267 | 0.9296 | 312 | 0.9148 | 357 | 0.9002 |
| 223 | 0.9442 | 268 | 0.9293 | 313 | 0.9145 | 358 | 0.8998 |
| 224 | 0.9439 | 269 | 0.9289 | 314 | 0.9141 | 359 | 0.8995 |
| 225 | 0.9436 | 270 | 0.9286 | 315 | 0.9138 | 360 | 0.8992 |
| 226 | 0.9432 | 271 | 0.9283 | 316 | 0.9135 | 361 | 0.8989 |
| 227 | 0.9429 | 272 | 0.9279 | 317 | 0.9132 | 362 | 0.8986 |
| 228 | 0.9426 | 273 | 0.9276 | 318 | 0.9128 | 363 | 0.8982 |
| 229 | 0.9422 | 274 | 0.9273 | 319 | 0.9125 | 364 | 0.8979 |
| 230 | 0.9419 | 275 | 0.9269 | 320 | 0.9122 | 365 | 0.8976 |
| 231 | 0.9416 | 276 | 0.9266 | 321 | 0.9118 | 366 | 0.8973 |
| 232 | 0.9412 | 277 | 0.9263 | 322 | 0.9115 | 367 | 0.8969 |
| 233 | 0.9409 | 278 | 0.9259 | 323 | 0.9112 | 368 | 0.8966 |
| 234 | 0.9405 | 279 | 0.9256 | 324 | 0.9109 | 369 | 0.8963 |
| 235 | 0.9402 | 280 | 0.9253 | 325 | 0.9105 | 370 | 0.8960 |
| 236 | 0.9399 | 281 | 0.9250 | 326 | 0.9102 | 371 | 0.8957 |
| 237 | 0.9395 | 282 | 0.9246 | 327 | 0.9099 | 372 | 0.8953 |
| 238 | 0.9392 | 283 | 0.9243 | 328 | 0.9096 | 373 | 0.8950 |
| 239 | 0.9389 | 284 | 0.9240 | 329 | 0.9092 | 374 | 0.8947 |
| 240 | 0.9385 | 285 | 0.9236 | 330 | 0.9089 | 375 | 0.8944 |
| 241 | 0.9382 | 286 | 0.9233 | 331 | 0.9086 | 376 | 0.8941 |
| 242 | 0.9379 | 287 | 0.9230 | 332 | 0.9083 | 377 | 0.8937 |
| 243 | 0.9375 | 288 | 0.9227 | 333 | 0.9079 | 378 | 0.8934 |
| 244 | 0.9372 | 289 | 0.9223 | 334 | 0.9076 | 379 | 0.8931 |
| 245 | 0.9369 | 290 | 0.9220 | 335 | 0.9073 | 380 | 0.8928 |
| 246 | 0.9365 | 291 | 0.9217 | 336 | 0.9070 | 381 | 0.8924 |
| 247 | 0.9362 | 292 | 0.9213 | 337 | 0.9066 | 382 | 0.8921 |
| 248 | 0.9359 | 293 | 0.9210 | 338 | 0.9063 | 383 | 0.8918 |
| 249 | 0.9356 | 294 | 0.9207 | 339 | 0.9060 | 384 | 0.8915 |
| 250 | 0.9352 | 295 | 0.9204 | 340 | 0.9057 | 385 | 0.8912 |
| 251 | 0.9349 | 296 | 0.9200 | 341 | 0.9053 | 386 | 0.8906 |
| 252 | 0.9346 | 297 | 0.9197 | 342 | 0.9050 | 387 | 0.8905 |
| 253 | 0.9342 | 298 | 0.9194 | 343 | 0.9047 | 388 | 0.8902 |
| 254 | 0.9339 | 299 | 0.9190 | 344 | 0.9044 | 389 | 0.8899 |
| 255 | 0.9336 | 300 | 0.9187 | 345 | 0.9040 | 390 | 0.8896 |
| 256 | 0.9332 | 301 | 0.9184 | 346 | 0.9037 | 391 | 0.8892 |
| 257 | 0.9329 | 302 | 0.9181 | 347 | 0.9034 | 392 | 0.8889 |
| 258 | 0.9326 | 303 | 0.9177 | 348 | 0.9031 | 393 | 0.8886 |
| 259 | 0.9322 | 304 | 0.9174 | 349 | 0.9028 | 394 | 0.8883 |
| 260 | 0.9319 | 305 | 0.9171 | 350 | 0.9024 | 395 | 0.8880 |
| 261 | 0.9316 | 306 | 0.9167 | 351 | 0.9021 | 396 | 0.8876 |
| 262 | 0.9312 | 307 | 0.9164 | 352 | 0.9018 | 397 | 0.8873 |
| 263 | 0.9309 | 308 | 0.9161 | 353 | 0.9015 | 398 | 0.8870 |
| 264 | 0.9306 | 309 | 0.9158 | 354 | 0.9011 | 399 | 0.8867 |
| | | | | | | 400 | 0.8864 |

**Table 904-2 Temperature-Volume Correction Factors**
**For Bituminous Materials**

Cut-Back Asphalt, Grades RC-T, RC-70, RC-250, MC-30, and MC-250.
Inverted Emulsified Asphalt, Grade IEMC-250.

| Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor |
|---|---|---|---|---|---|---|---|
| 40 | 1.0080 | 85 | 0.9901 | 130 | 0.9725 | 175 | 0.9551 |
| 41 | 1.0076 | 86 | 0.9897 | 131 | 0.9720 | 176 | 0.9547 |
| 42 | 1.0072 | 87 | 0.9893 | 132 | 0.9717 | 177 | 0.9543 |
| 43 | 1.0068 | 88 | 0.9889 | 133 | 0.9713 | 178 | 0.9539 |
| 44 | 1.0064 | 89 | 0.9885 | 134 | 0.9709 | 179 | 0.9536 |
| 45 | 1.0060 | 90 | 0.9881 | 135 | 0.9705 | 180 | 0.9532 |
| 46 | 1.0056 | 91 | 0.9877 | 136 | 0.9701 | 181 | 0.9528 |
| 47 | 1.0052 | 92 | 0.9873 | 137 | 0.9697 | 182 | 0.9524 |
| 48 | 1.0048 | 93 | 0.9869 | 138 | 0.9693 | 183 | 0.9520 |
| 49 | 1.0044 | 94 | 0.9865 | 139 | 0.9690 | 184 | 0.9517 |
| 50 | 1.0040 | 95 | 0.9861 | 140 | 0.9686 | 185 | 0.9513 |
| 51 | 1.0036 | 96 | 0.9857 | 141 | 0.9682 | 186 | 0.9509 |
| 52 | 1.0032 | 97 | 0.9854 | 142 | 0.9678 | 187 | 0.9505 |
| 53 | 1.0028 | 98 | 0.9850 | 143 | 0.9674 | 188 | 0.9501 |
| 54 | 1.0024 | 99 | 0.9846 | 144 | 0.9670 | 189 | 0.9498 |
| 55 | 1.0020 | 100 | 0.9842 | 145 | 0.9666 | 190 | 0.9494 |
| 56 | 1.0016 | 101 | 0.9838 | 146 | 0.9662 | 191 | 0.9490 |
| 57 | 1.0012 | 102 | 0.9834 | 147 | 0.9659 | 192 | 0.9486 |
| 58 | 1.0008 | 103 | 0.9830 | 148 | 0.9655 | 193 | 0.9482 |
| 59 | 1.0004 | 104 | 0.9826 | 149 | 0.9651 | 194 | 0.9478 |
| 60 | 1.0000 | 105 | 0.9822 | 150 | 0.9647 | 195 | 0.9475 |
| 61 | 0.9996 | 106 | 0.9818 | 151 | 0.9643 | 196 | 0.9471 |
| 62 | 0.9993 | 107 | 0.9814 | 152 | 0.9639 | 197 | 0.9467 |
| 63 | 0.9988 | 108 | 0.9810 | 153 | 0.9635 | 198 | 0.9463 |
| 64 | 0.9984 | 109 | 0.9806 | 154 | 0.9632 | 199 | 0.9460 |
| 65 | 0.9980 | 110 | 0.9803 | 155 | 0.9628 | 200 | 0.9456 |
| 66 | 0.9976 | 111 | 0.9799 | 156 | 0.9624 | 201 | 0.9452 |
| 67 | 0.9972 | 112 | 0.9795 | 157 | 0.9620 | 202 | 0.9448 |
| 68 | 0.9968 | 113 | 0.9791 | 158 | 0.9616 | 203 | 0.9443 |
| 69 | 0.9964 | 114 | 0.9787 | 159 | 0.9612 | 204 | 0.9441 |
| 70 | 0.9960 | 115 | 0.9783 | 160 | 0.9609 | 205 | 0.9437 |
| 71 | 0.9956 | 116 | 0.9779 | 161 | 0.9605 | 206 | 0.9433 |
| 72 | 0.9952 | 117 | 0.9775 | 162 | 0.9601 | 207 | 0.9429 |
| 73 | 0.9948 | 118 | 0.9771 | 163 | 0.9597 | 208 | 0.9425 |
| 74 | 0.9944 | 119 | 0.9767 | 164 | 0.9593 | 209 | 0.9422 |
| 75 | 0.9940 | 120 | 0.9763 | 165 | 0.9589 | 210 | 0.9418 |
| 76 | 0.9936 | 121 | 0.9760 | 166 | 0.9585 | 211 | 0.9414 |
| 77 | 0.9932 | 122 | 0.9756 | 167 | 0.9582 | 212 | 0.9410 |
| 78 | 0.9929 | 123 | 0.9752 | 168 | 0.9578 | 213 | 0.9407 |
| 79 | 0.9925 | 124 | 0.9748 | 169 | 0.9574 | 214 | 0.9403 |
| 80 | 0.9921 | 125 | 0.9744 | 170 | 0.9570 | 215 | 0.9399 |
| 81 | 0.9917 | 126 | 0.9740 | 171 | 0.9566 | 216 | 0.9395 |
| 82 | 0.9913 | 127 | 0.9736 | 172 | 0.9562 | 217 | 0.9391 |
| 83 | 0.9909 | 128 | 0.9732 | 173 | 0.9559 | 218 | 0.9388 |
| 84 | 0.9905 | 129 | 0.9728 | 174 | 0.9555 | 219 | 0.9384 |

**Table 904-2 (Continued)**

| Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor |
|---|---|---|---|---|---|---|---|
| 220 | 0.9380 | 265 | 0.9212 | 310 | 0.9047 | 355 | 0.8884 |
| 221 | 0.9376 | 266 | 0.9208 | 311 | 0.9043 | 356 | 0.8881 |
| 222 | 0.9373 | 267 | 0.9205 | 312 | 0.9039 | 357 | 0.8877 |
| 223 | 0.9369 | 268 | 0.9201 | 313 | 0.9036 | 358 | 0.8873 |
| 224 | 0.9365 | 269 | 0.9197 | 314 | 0.9032 | 359 | 0.8870 |
| 225 | 0.9361 | 270 | 0.9194 | 315 | 0.9029 | 360 | 0.8866 |
| 226 | 0.9358 | 271 | 0.9190 | 316 | 0.9025 | 361 | 0.8863 |
| 227 | 0.9354 | 272 | 0.9186 | 317 | 0.9021 | 362 | 0.8859 |
| 228 | 0.9350 | 273 | 0.9182 | 318 | 0.9018 | 363 | 0.8856 |
| 229 | 0.9346 | 274 | 0.9179 | 319 | 0.9014 | 364 | 0.8852 |
| 230 | 0.9343 | 275 | 0.9175 | 320 | 0.9010 | 365 | 0.8848 |
| 231 | 0.9339 | 276 | 0.9171 | 321 | 0.9007 | 366 | 0.8845 |
| 232 | 0.9335 | 277 | 0.9168 | 322 | 0.9003 | 367 | 0.8841 |
| 233 | 0.9331 | 278 | 0.9164 | 323 | 0.9000 | 368 | 0.8838 |
| 234 | 0.9328 | 279 | 0.9160 | 324 | 0.8996 | 369 | 0.8834 |
| 235 | 0.9324 | 280 | 0.9157 | 325 | 0.8992 | 370 | 0.8831 |
| 236 | 0.9320 | 281 | 0.9153 | 326 | 0.8989 | 371 | 0.8827 |
| 237 | 0.9316 | 282 | 0.9149 | 327 | 0.8985 | 372 | 0.8823 |
| 238 | 0.9313 | 283 | 0.9146 | 328 | 0.8981 | 373 | 0.8820 |
| 239 | 0.9309 | 284 | 0.9142 | 329 | 0.8978 | 374 | 0.8816 |
| 240 | 0.9305 | 285 | 0.9138 | 330 | 0.8974 | 375 | 0.8813 |
| 241 | 0.9301 | 286 | 0.9135 | 331 | 0.8971 | 376 | 0.8809 |
| 242 | 0.9298 | 287 | 0.9131 | 332 | 0.8967 | 377 | 0.8806 |
| 243 | 0.9294 | 288 | 0.9127 | 333 | 0.8963 | 378 | 0.8802 |
| 244 | 0.9290 | 289 | 0.9124 | 334 | 0.8960 | 379 | 0.8799 |
| 245 | 0.9286 | 290 | 0.9120 | 335 | 0.8956 | 380 | 0.8795 |
| 246 | 0.9283 | 291 | 0.9116 | 336 | 0.8952 | 381 | 0.8792 |
| 247 | 0.9279 | 292 | 0.9113 | 337 | 0.8949 | 382 | 0.8788 |
| 248 | 0.9275 | 293 | 0.9109 | 338 | 0.8945 | 383 | 0.8784 |
| 249 | 0.9272 | 294 | 0.9105 | 339 | 0.8942 | 384 | 0.8781 |
| 250 | 0.9268 | 295 | 0.9102 | 340 | 0.8938 | 385 | 0.8777 |
| 251 | 0.9264 | 296 | 0.9098 | 341 | 0.8934 | 386 | 0.8774 |
| 252 | 0.9260 | 297 | 0.9094 | 342 | 0.8931 | 387 | 0.8770 |
| 253 | 0.9257 | 298 | 0.9091 | 343 | 0.8927 | 388 | 0.8767 |
| 254 | 0.9253 | 299 | 0.9087 | 344 | 0.8924 | 389 | 0.8763 |
| 255 | 0.9249 | 300 | 0.9083 | 345 | 0.8920 | 390 | 0.8760 |
| 256 | 0.9245 | 301 | 0.9080 | 346 | 0.8916 | 391 | 0.8756 |
| 257 | 0.9242 | 302 | 0.9076 | 347 | 0.8913 | 392 | 0.8753 |
| 258 | 0.9238 | 303 | 0.9072 | 348 | 0.8909 | 393 | 0.8749 |
| 259 | 0.9234 | 304 | 0.9069 | 349 | 0.8906 | 394 | 0.8746 |
| 260 | 0.9231 | 305 | 0.9065 | 350 | 0.8902 | 395 | 0.8742 |
| 261 | 0.9227 | 306 | 0.9061 | 351 | 0.8899 | 396 | 0.8738 |
| 262 | 0.9223 | 307 | 0.9058 | 352 | 0.8895 | 397 | 0.8735 |
| 263 | 0.9219 | 308 | 0.9054 | 353 | 0.8891 | 398 | 0.8731 |
| 264 | 0.9216 | 309 | 0.9050 | 354 | 0.8888 | 399 | 0.8728 |
| | | | | | | 400 | 0.8724 |

**Table 904-3 Temperature-Volume Correction Factors for Bituminous Materials**

Emulsified Asphalt, All Grades.

| Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor | Temp (ºF) | Factor |
|---|---|---|---|---|---|---|---|
| 40 | 1.0050 | 75 | 0.9963 | 110 | 0.9876 | 145 | 0.9792 |
| 41 | 1.0048 | 76 | 0.9960 | 111 | 0.9874 | 146 | 0.9790 |
| 42 | 1.0045 | 77 | 0.9958 | 112 | 0.9872 | 147 | 0.9787 |
| 43 | 1.0043 | 78 | 0.9955 | 113 | 0.9869 | 148 | 0.9785 |
| 44 | 1.0040 | 79 | 0.9953 | 114 | 0.9867 | 149 | 0.9782 |
| 45 | 1.0038 | 80 | 0.9950 | 115 | 0.9864 | 150 | 0.9780 |
| 46 | 1.0035 | 81 | 0.9948 | 116 | 0.9862 | 151 | 0.9778 |
| 47 | 1.0033 | 82 | 0.9945 | 117 | 0.9860 | 152 | 0.9775 |
| 48 | 1.0030 | 83 | 0.9943 | 118 | 0.9857 | 153 | 0.9773 |
| 49 | 1.0028 | 84 | 0.9940 | 119 | 0.9855 | 154 | 0.9770 |
| 50 | 1.0025 | 85 | 0.9938 | 120 | 0.9852 | 155 | 0.9768 |
| 51 | 1.0023 | 86 | 0.9935 | 121 | 0.9850 | 156 | 0.9766 |
| 52 | 1.0020 | 87 | 0.9933 | 122 | 0.9847 | 157 | 0.9763 |
| 53 | 1.0018 | 88 | 0.9930 | 123 | 0.9845 | 158 | 0.9761 |
| 54 | 1.0015 | 89 | 0.9928 | 124 | 0.9843 | 159 | 0.9758 |
| 55 | 1.0013 | 90 | 0.9925 | 125 | 0.9840 | 160 | 0.9756 |
| 56 | 1.0010 | 91 | 0.9923 | 126 | 0.9838 | 161 | 0.9754 |
| 57 | 1.0008 | 92 | 0.9920 | 127 | 0.9835 | 162 | 0.9751 |
| 58 | 1.0005 | 93 | 0.9918 | 128 | 0.9833 | 163 | 0.9749 |
| 59 | 1.0003 | 94 | 0.9915 | 129 | 0.9830 | 164 | 0.9747 |
| 60 | 1.0000 | 95 | 0.9913 | 130 | 0.9828 | 165 | 0.9744 |
| 61 | 0.9998 | 96 | 0.9910 | 131 | 0.9826 | 166 | 0.9742 |
| 62 | 0.9995 | 97 | 0.9908 | 132 | 0.9823 | 167 | 0.9739 |
| 63 | 0.9993 | 98 | 0.9905 | 133 | 0.9821 | 168 | 0.9737 |
| 64 | 0.9990 | 99 | 0.9903 | 134 | 0.9818 | 169 | 0.9735 |
| 65 | 0.9988 | 100 | 0.9901 | 135 | 0.9816 | 170 | 0.9732 |
| 66 | 0.9985 | 101 | 0.9899 | 136 | 0.9814 | 171 | 0.9730 |
| 67 | 0.9983 | 102 | 0.9896 | 137 | 0.9811 | 172 | 0.9728 |
| 68 | 0.9980 | 103 | 0.9894 | 138 | 0.9809 | 173 | 0.9725 |
| 69 | 0.9978 | 104 | 0.9891 | 139 | 0.9806 | 174 | 0.9723 |
| 70 | 0.9975 | 105 | 0.9889 | 140 | 0.9804 | 175 | 0.9721 |
| 71 | 0.9973 | 106 | 0.9886 | 141 | 0.9802 | 176 | 0.9718 |
| 72 | 0.9970 | 107 | 0.9884 | 142 | 0.9799 | 177 | 0.9716 |
| 73 | 0.9968 | 108 | 0.9881 | 143 | 0.9797 | 178 | 0.9713 |
| 74 | 0.9965 | 109 | 0.9879 | 144 | 0.9794 | 179 | 0.9711 |

## SECTION 905 - CONCRETE ADMIXTURES AND CURING MATERIALS

THE FOLLOWING SUBSECTION IS ADDED:

**905.06 Detectable Warning Surfaces.**

Materials for Detectable Warning Surfaces shall be safety red and appear uniform in color after curing. The surface coating material shall be an abrasion, UV and chemical resistant and shall be capable of adhering to existing or new portland cement concrete surfaces. The minimum final dry coat thickness shall be 40 mils.

The cured coating shall exhibit the following minimum coefficients of friction when tested according to ASTM D 1894.

| **Static coefficient of friction** | **Dynamic coefficient of friction** |
|---|---|
| Dry 0.95 – 0.99 | Dry 0.91 – 0.95 |
| Wet 1.39 – 1.42 | Wet 1.27 – 1.36 |

## SECTION 906 - ELECTRICAL MATERIALS

THE FOLLOWING IS ADDED TO THIS SECTION:

**906.21 Telephone Cable.**

Telephone Cable shall meet the following criteria:

(a) ___ AWG tinned copper conductor (size as shown on the plans)
(b) Connectors in twisted pairs
(c) Category 3 performance
(d) Chrome PVC Jacket
(e) Beldfoil shield overall
(f) 20 AWG stranded copper ground wire

## SECTION 908 – JOINT MATERIALS

**908.02 Joint Sealers.**
THE FIRST PARAGRAPH IS CHANGED TO:

Hot-poured joint sealer for joints and cracks in both HMA and portland cement concrete surface course shall be sealant conforming to Subsections 908.06, 908.07, and ASTM D 6690 as follows:

1. Type II Sealant shall be used when sealing cracks in HMA.
2. Type IV Sealant shall be used when sealing joints and cracks in Portland cement concrete pavements and HMA saw and seal applications.

**908.03 Preformed Elastomeric Joint Sealer (Compression Type)**

**A. Requirements.**

THE SECOND SENTENCE IS CHANGED TO:

The material shall conform to the physical properties specified in Table 1 of ASTM D 3542 and as modified herein. The Compression-Deflection properties specified in Table 1 of ASTM 3542 shall be replaced with NJDOT Test Method J-2 as provided within these Specifications. The requirement for Pressure Deflection shall be 3.5 psi.

THE FIRST SENTENCE OF THE FIFTH PARAGRAPH IS CHANGED TO:

The width to height ratio of the compression sealer shall never be less than 90%.

**908.05 Strip Seal Expansion Dam.**

**B. Glandular Type Strip Seal.**

**1. Scope.**

THE FIRST SENTENCE IS CHANGED TO:

This specification covers the material requirements for glandular type strip seal deck joint systems consisting of an extruded neoprene rubber gland seal mechanically locked in the cavities of two parallel steel rail sections.

**3. Metal Components and Adhesive.**

THE FIRST AND SECOND SENTENCES ARE CHANGED TO:

Steel rail sections shall conform to AASHTO M 270 Grade 36 or 50. Steel for plates, shapes and other structural steel used in the deck joint system shall conform to AASHTO M 270 Grade 36 or 50.

THE FOLLOWING NEW SUBSECTION IS ADDED:

**908.08 Polymerized Joint Adhesive.**

Polymerized joint adhesive shall be hot-applied asphaltic joint adhesive/sealer and shall conform to the physical properties in Table 908-6 below.

**Table 908-6 Tests for Identification**

| Property | ASTM Test Procedure | Physical Requirements |
|---|---|---|
| Brookfield Viscosity, 400ºF | D 2669 | 3,000 – 10,000 cp |
| Cone Penetration, 77ºF | D 5329 | 60-100 |
| Flow, 140ºF | D 5329 | 1/4 inch maximum |
| Resilience, 77ºF | D 5329 | 30% minimum |
| Ductility, 77ºF | D 113 | 1 foot minimum |
| Ductility, 39.2ºF | D 113 | 1 foot minimum |
| Tensile Adhesion, 77ºF | D 5329 | 500% minimum |
| Softening Point | D 36 | 170ºF minimum |
| Asphalt Compatibility | D 5329 | Pass |

The manufacturer of the joint adhesive shall provide documentation of recommended pour temperature and safe heating temperature for the material and shall submit certifications of compliance according to Subsection 106.04.

## SECTION 909 – LANDSCAPING MATERIALS

**909.10 Topsoil.**

**A. Unacceptable Topsoil Sources.**

ITEM 1. IS CHANGED TO:

1. Soils having less than 4.1 pH value, or greater than 8.0 pH value.

## SECTION 912 - PAINTS, COATINGS, AND MARKINGS

**912.10 Pavements Stripes or Markings.**

**C. Thermoplastic.**

THE SECOND AND THIRD SUBPARTS ARE CHANGED TO:

2. For white, the composition of the mixture shall be as follows:

| Component | Percent by weight |
|---|---|
| Resin/Binder | 22-26 percent |
| Glass Beads (pre-mix) | 30 percent minimum |
| WhitePigment | 10 percent minimum |
| Calcium Carbonate and Inert Fillers | |

(shall not contain silica other than as glass beads) ..... 34-38 percent

3. Only yellow non-lead formulas shall be used, the composition of the mixture shall be as follows:

| **Component** | **Percent by weight** |
|---|---|
| Resin/Binder | 22-26 percent |
| Glass Beads (pre-mix) | 30 percent minimum |
| Yellow Pigment | 2 percent minimum |
| Calcium Carbonate and Inert Fillers (shall not contain silica other than as glass beads) | 42-46 percent |

The yellow material's combined totals of lead, cadmium, mercury, and hexavalent chromium shall not exceed 100 parts per million.

The thermoplastic manufacturer shall certify, according to Subsection 106.04, that the material will meet the requirements specified.

THE FOLLOWING IS ADDED TO THE END OF LIST:

**D. Preformed Traffic Tape.** Preformed traffic tape for permanent and temporary applications shall be from the NJDOT approved products list maintained by the Bureau of Materials Engineering and Testing.

**912.12 Removable Pavement Marking Tape and Removable Black Line Masking Tape.**
THE SUBSECTION HEADING AND SUBPART A IS CHANGED TO:

**912.12 Removable Wet Weather Pavement Marking Tape and Removable Black Line Masking Tape.**

**A. Removable Wet Weather Pavement Marking Tape.** The removable wet weather pavement marking tape shall consist of polymeric, conformable backing materials with a retroreflective surface designed to provide retroreflectivity in wet conditions. The underside of the tape shall be precoated with a pressure sensitive adhesive which bonds the tape to the roadway surface so as to be able to withstand traffic immediately after installation. Primers shall be used to promote tape adhesion to the pavement only in accordance with the tape manufacturers recommendations.

Daylight color of the white tape shall be no darker than color No. 37778 of FED-STD-595B. Daylight color of the yellow tape shall conform to the FHWA color tolerance chart for highway yellow.

THE THIRD PARAGRAPH IS CHANGED TO:

When measured with a LTL-2000 Retrometer, the tape shall have initial, minimum retroflectance values conforming to:

**Dry Condition – ASTM E 1710**
**Entrance Angle = 88.76°**

| **Observation Angle** | **Specific Luminance** | |
|---|---|---|
| | **White** | **Yellow** |
| (Degrees) | (Millicandelas per square foot per footcandle) | (Millicandelas per square foot per footcandle) |
| 1.05 | 750 | 450 |

Note: The angular aperture of both the photoreceptor and the light projector shall be six minutes of arc. The reference axis shall be taken perpendicular to the test sample.

**Continuous Wet Condition – ASTM E 2176**
**Entrance Angle = 88.76°**

| Observation Angle | Specific Luminance | |
|---|---|---|
| | **White** | **Yellow** |
| (Degrees) | (Millicandelas per square foot per footcandle) | (Millicandelas per square foot per footcandle) |
| 1.05 | 750 | 350 |

The removable tape shall be capable of being removed manually, intact or in large pieces, at temperatures above 40 °F without the use of solvents, burning, grinding, or blasting. Only tape that has previously received the approval of the Department Bureau of Materials shall be used. Certification of Compliance shall be furnished according to Subsection 106.04.

**912.13 Inorganic Zinc Coating System.**
THE FOLLOWING IS ADDED:

A complete coating system of an inorganic zinc rich primer, a high build epoxy intermediate coat and a urethane finish coat shall be selected from one of the approved coating systems listed on the following website:

http://www.state.nj.us/transportation/eng/technology/materials

All products for the complete system, including thinners and solvents, shall be from the same manufacturer and shall be from the Qualified Paint List.

Drying time between coats shall be per the manufacturer's recommendations.

The following information shall be submitted for the system selected at least one month before painting is anticipated:

1. A 1-gallon sample for each coat of paint in the system.
2. Infrared curves (0.1 to 0.6 mils) for each coat. Curves for the dry film of the vehicle (binder) of each component and for the mixed paint shall be included.
3. Weight per gallon, at 77 °F, for each coat. Variance shall be within plus or minus 1.8 ounces of the normal weight per gallon of the sample that was approved and placed on the QPL.
4. Viscosity in Krebs Units, at 77 °F, for each coat. Variance shall be within plus or minus 5 Krebs Units, or equivalent units of another viscometer, of the viscosity of the sample that was approved and placed on the QPL.
5. Percent of solids by weight of each coat.
6. Percent of metallic zinc by weight in the dry film of the cured zinc primer coat. This percentage shall be greater than or equal to that of the sample that was approved and placed on the QPL.
7. Percent of metallic zinc by weight in the zinc pigment component.
8. Finish coat color chips for selection of color by the Engineer.
9. The required curing time and dry film thickness for the qualification of the zinc primer for slip-critical connections in conformance with the requirements of AASHTO, Division I, Table 10.32.3C for Class of Surface B. A certified test report with the slip coefficient tested according to AASHTO Division 1, Article 10.32.3.2.3.
10. Technical data sheets, MSDS, and specific application instructions for all coats. In the event of a conflict between the data/instruction sheets and these Specifications, with the approval of the Engineer, the manufacturer's requirements shall govern. Work shall not be allowed to proceed until the information is received and approved.
11. Mixing and thinning directions.
12. Recommended spray nozzles and pressures.

The Contractor shall submit the manufacturer's recommended repair procedures to correct damage such as that caused in handling and shipping, deficient or excessive coating thickness, removal of zinc salts and other contaminants that would be detrimental to succeeding coats, and procedures for surface preparation and painting of rust spots.

The Contractor shall provide the services of a paint or a painting technical representative from the paint manufacturer at the beginning of operations and whenever required during operations.

Each container of paint shall be labeled to show the name of the manufacturer, the trade name designation of the contents, the lot or batch number, the date of manufacture, and the volumetric contents in gallons or the weight of zinc

powder in pounds. Each container shall be labeled according to the Code of Federal Regulations for flammables and shall contain all information necessary to comply with NJSA 34:5A-1 New Jersey Worker and Community Right To Know Act.

**912.14 Epoxy Mastic Coating System.**
THE FOLLOWING IS ADDED:

A complete coating system of an aluminum epoxy mastic primer and a urethan finish coat shall be selected from one of the approved coating systems listed on the following website:

http://www.state.nj.us/transportation/eng/technology/materials

All products for the complete system, including thinners and solvents, shall be from the same manufacturer and shall be from the Qualified Paint List.

Drying time between coats shall be per the manufacturer's recommendations.

The following information shall be submitted for the system selected at least one month before painting is anticipated:

1. A 1-gallon sample for each coat of paint in the system.
2. Infrared curves (0.1 to 0.6 mils) for each coat. Curves for the dry film of the vehicle (binder) of each component and for the mixed paint shall be included.
3. Weight per gallon, at 77 °F, for each coat. Variance shall be within plus or minus 1.8 ounces of the nominal weight per gallon of the sample that was approved and placed on the QPL.
4. Viscosity in Krebs Units, at 77 °F, for each coat. Variance shall be within plus or minus 5 Krebs Units, or equivalent units of another viscometer, of the viscosity of the sample that was approved and placed on the QPL.
5. Percent of solids by weight of each coat.
6. Finish coat color chips for selection of color by the Engineer.
7. Technical data sheets, MSDS, and specific application instructions for all coats. In the event of a conflict between the data/instruction sheets and these Specifications, with the approval of the Engineer, the manufacturer's requirements shall govern. Work shall not be allowed to proceed until the information is received and approved.
8. Mixing and thinning directions.
9. Recommended spray nozzles and pressures.

The Contractor shall submit the manufacturer's recommended repair procedures to correct damage such as that caused in handling and shipping, deficient or excessive coating thickness, removal of zinc salts and other contaminants that would be detrimental to succeeding coats, and procedures for surface preparation and painting of rust spots.

The Contractor shall provide the services of a paint or a painting technical representative from the paint manufacturer at the beginning of operations and whenever required during operations.

Each container of paint shall be labeled to show the name of the manufacturer, the trade name designation of the contents, the lot or batch number, the date of manufacture, and the volumetric contents in gallons or the weight of zinc powder in pounds. Each container shall be labeled according to the Code of Federal Regulations for flammables and shall contain all information necessary to comply with NJSA 34:5A-1 New Jersey Worker and Community Right To Know Act.

**912.15 Organic Zinc Coating System.**
THE FOLLOWING IS ADDED:

A complete coating system of an organic zinc rich primer, a high build epoxy intermediate coat and a urethane finish coat shall be selected from one of the approved coating systems listed on the following website:

http://www.state.nj.us/transportation/eng/technology/materials

All products for the complete system, including thinners and solvents, shall be from the same manufacturer and shall be from the Qualified Paint List (QPL).

Drying time between coats shall be per the manufacturer's recommendations.

The following information shall be submitted for the system selected at least one month before painting is anticipated:

1. A 1-gallon sample for each coat of paint in the system.
2. Infrared curves (0.1 to 0.6 mils) for the zinc primer, intermediate, and finish coats to include curves for the dry film of the vehicle (binder) of each component and for the mixed paint.
3. Weight per gallon, at 77 °F, for the zinc primer, intermediate, and finish coats. Variance shall be within plus or minus 1.8 ounces of the nominal weight per gallon of the sample that was approved and placed on the QPL.
4. Viscosity in Krebs Units, at 77 °F, for the zinc primer vehicle and the intermediate and finish coat paints. Variance shall be within plus or minus 5 Krebs Units, or equivalent units of another viscometer, of the viscosity of the sample that was approved and placed on the QPL.
5. Percent of solids by weight of the zinc primer vehicle and the intermediate and finish coat paints.
6. Percent of metallic zinc by weight in the dry film of the cured zinc primer coat. This percentage shall be greater than or equal to that of the sample that was approved and placed on the QPL.
7. Percent of metallic zinc by weight in the zinc pigment component.
8. Finish coat color chips for selection of color by the Engineer.
9. The required curing time and dry film thickness for the qualification of the zinc primer for slip-critical connections in conformance with the requirements of AASHTO, Division I, Table 10.32.3C for Class of Surface A. A certified test report with the slip coefficient tested according to AASHTO Division 1 Article 10.32.3.2.2.
10. Technical data sheets, MSDS, and specific application instructions for all coats. In the event of a conflict between the data/instruction sheets and these Specifications, with the approval of the Engineer, the manufacturer's requirements shall govern. Work shall not be allowed to proceed until the information is received and approved.
11. Mixing and thinning directions.
12. Recommended spray nozzles and pressures.

The Contractor shall submit the manufacturer's recommended repair procedures to correct damage such as that caused in handling and shipping, deficient or excessive coating thickness, removal of zinc salts and other contaminants that would be detrimental to succeeding coats, and procedures for surface preparation and painting of rust spots.

The Contractor shall provide the services of a paint or a painting technical representative from the paint manufacturer at the beginning of operations and whenever required during operations.

Each container of paint shall be labeled to show the name of the manufacturer, the trade name designation of the contents, the lot or batch number, the date of manufacture, and the volumetric contents in gallons or the weight of zinc powder in pounds. Each container shall be labeled according to the Code of Federal Regulations for flammables and shall contain all information necessary to comply with NJSA 34:5A-1 New Jersey Worker and Community Right To Know Act.

**912.17 Pavement Reflectors and Castings.**
THE FOLLOWING IS ADDED:

6. **Alternate pavement reflectors and castings.** Alternate pavement reflectors and castings shall be from the NJDOT approved products list maintained by the bureau of materials engineering and testing.

## SECTION 913 - PIPE

**913.03 Ductile Iron Water Pipe.**
THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Ductile iron water pipe shall conform to ANSI/AWWA C151/A21.51.

**913.11 Plastic Drainage Pipe.**
THE SUBSECTION HEADING AND ENTIRE TEXT ARE CHANGED TO:

**913.11 High Density Polyethylene (HDPE), PVC Drainage Pipe.**

Corrugated HDPE drainage pipe shall conform to AASHTO M 252 or AASHTO M 294M. PVC drainage pipe shall conform to ASTM D 2729.

## SECTION 914 – PORTLAND CEMENT CONCRETE, MORTAR, AND GROUT

THE TITLE OF THIS SECTION IS CHANGED TO:

## SECTION 914 – PORTLAND OR BLENDED HYDRAULIC CEMENT CONCRETE, MORTAR, AND GROUT

**914.01 Composition of Portland Cement Concrete.**

THE TITLE AND SUBSECTION ARE CHANGED TO:

**914.01 Composition of Portland or Blended Hydraulic Cement Concrete.**

Portland cement concrete shall be composed of portland cement or blended hydraulic cement, coarse aggregate, fine aggregate, admixtures, and water. Portland cement concrete except white concrete may include fly ash, Ground Granulated Blast Furnace Slag or Silica Fume. Materials shall conform to the following Subsections:

| | |
|---|---|
| Aggregates | 901.12 |
| Admixtures: | |
| Air-Entraining | 905.01 |
| Chemical | 905.02 |
| Mineral: | |
| Fly Ash | 919.07 |
| Silica Fume | 919.10(b) |
| Ground Granulated Blast Furnace Slag | 919.18 |
| Portland Cement | 919.11 |
| Water | 919.15 |

Chemical admixtures conforming to the requirements of Subsection 905.02 may be used in the mix design of structural concrete items.

**914.02 Portland Cement Concrete Design, Control, and Acceptance Testing Requirements.**

THE TITLE OF THIS SUBSECTION IS CHANGED TO:

**914.02 Portland or Blended Hydraulic Cement Concrete Design, Control, and Acceptance Testing Requirements.**

THE LIST FOR THE SELECTED STRUCTURAL CONCRETE PAY ITEM ADJUSTMENT HAS BEEN CHANGED TO:

**E. Acceptance Testing for Strength for Pay Adjustment Items.** Concrete Pay Items which are subject to pay adjustment and the base prices are as follows:

NONE

**B. Proportioning and Verification.**

THE SECOND SENTENCE OF THE THIRD PARAGRAPH IS CHANGED TO:

At least six 4 by 8 inch test cylinders shall be prepared from each batch and cured according to AASHTO T 23 or AASHTO T 126.

THE FIRST SENTENCE OF THE TENTH PARAGRAPH IS CHANGED TO:

Classes A and B concrete may be designed to achieve early strength requirements by increasing the Cement content.

**C. Acceptance Testing Procedures for Slump and Air Entrainment.**

THE FIRST SENTENCE OF THE FOURTH PARAGRAPH IS CHANGED TO:

Following any permitted additions, the drum shall be rotated at the recommended mixing speed for a minimum of 30 revolutions without exceeding 300 total revolutions, the original test results shall be disregarded, and a single test for both slump and air entrainment performed.

**D. General Acceptance Testing Requirements for Strength.**

THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAPH:

Concrete test specimens which are to be used for determination of early strengths for form removal, opening to traffic, or otherwise placing the concrete into service shall be cured according to the field curing provisions in AASHTO T 23.

**E. Acceptance Testing for Strength for Pay-Adjustment Items.**

THE ENTIRE TEXT OF THIS SUBPART AFTER THE FIRST PARAGRAPH IS CHANGED TO:

The amount of pay-adjustment in dollars is the product of the Pay Item base price times the lot quantity times the percent pay-adjustment (expressed as a decimal) given by Equation 1 or Equation 2.

**Equation 1 and Equation 2:**

| Quality | Pay-adjustment (Percent) | |
|---|---|---|
| PD < 50 | PPA = 3.0 - 0.3 PD | Equation 1 |
| PD ≥ 50 | PPA = 26.0 - 0.76 PD | Equation 2 |

Where: PPA = Percent Pay-adjustment
PD = Percent Defective (Estimate of percent of lot below the class design strength by the use of Equation 3 and Subsection 914.05, Table 914-5)

**Equation 3:**

$$Q = (ALS - CDS) / S$$

Where: Q = Quality index for pay-adjustment computations
ALS = Average lot strength in psi
CDS = Class design strength in psi
S = Standard deviation of the strength test results in psi for the lot as computed by Equation 4

**Equation 4:**

$$S = \sqrt{\frac{\Sigma(Xi - ALS)^2}{N - 1}}$$

Where: $\Sigma$ = Summation
Xi = Individual test result (average strength of a test cylinder pair)
N = Number of test results for the lot

Note: When only a single test result is available, the standard deviation "S" is assumed to equal 200 psi.

For lots having percent defective (PD) levels less than 10 percent, Equation 1 provides positive adjustments to the contract price. For lots having exactly 10 percent defective, there is no adjustment to the contract price. For lots having greater than 10 percent defective, Equations 1 or 2, as appropriate, subtract progressively larger amounts from the contract price.

If, based on the initial series of tests, the lot quality of a pay-adjustment item is estimated to be PD = 50 or greater, or if any individual test value (average of a cylinder pair) falls below the retest limit for non-pay-

adjustment concrete in Subsection 914.05, Table 914-4, the Engineer has the option to reevaluate by coring or other suitable means. When this provision is applied to Class P concrete, each beam or pile in the steam bed will be evaluated separately.

If the Department elects not to core, the Contractor may accept the pay-adjustment of (PPA) calculated by Equation 2 or, when approved by the Engineer, may take cores according to Subsection 914.05, Table 914-4 at no cost to the Department. The Contractor must take the cores within 60 days from notification of the option to core. As an aid in making this decision, the Contractor will be permitted to perform nondestructive testing using a method or device approved by the Engineer.

When re-evaluation is accomplished by a method other than coring, the results will be used only to determine what further action is to be taken. If any of the non-core tests results are below the class design strength, the Engineer has the option to core. If this option is waived, the Contractor may elect to core, at no cost to the State and within 60 days after being presented with this option, or to accept the pay-adjustment computed from the initial test cylinder results. If the Contractor elects to core, the coring shall be performed as directed and the Department will test the cores. If none of the non-core test results is below the class design strength, the Engineer may elect either to core or to accept the lot at 100 percent payment.

If, based on the core results, the lot is determined to be at a quality level of PD < 75, the pay-adjustment shall be computed by Equation 1 or Equation 2, as appropriate. If the lot is confirmed to be at a quality level of PD = 75 or greater, the lot is considered to be rejectable and the Engineer may:

1. Require the Contractor to remove and replace the defective lot at no cost to the State,
2. Allow the Contractor to leave the defective lot in place and receive a percent pay-adjustment (PPA) computed by Equation 2, or
3. Allow the Contractor to submit a plan, for approval, for corrective action to be performed at no cost to the State. If the plan for corrective action is not approved, either option 1 or 2 above may be applied.

**F. Acceptance Testing for Strength for Non-Pay-Adjustment Items.**

THE ENTIRE TEXT OF THIS SUBPART IS CHANGED TO:

All concrete items not specifically designated as pay-adjustment items as described in Subsection 914.02, Subpart E are considered to be non-pay-adjustment items, but may be accepted by pay-adjustment under certain circumstances. Such an item is eligible for 100 percent payment (PA = 0) provided the retest limit of Subsection 914.05, Table 914-4 is met. If this requirement is not met, the item will be treated as a pay-adjustment item according to Subsection 914.02, Subpart E, and all pay-adjustment provisions shall apply except that the item bid price will be used instead of an item base price in the computation of the pay-adjustment.

When a pay-adjustment is computed for any of the following items, which are only partially composed of concrete, the amount of pay-adjustment, if any, will be multiplied by the Estimated Percentage of Concrete (expressed as a decimal) as indicated below:

| **Pay Item** | **Estimate Percentage of Concrete** |
|---|---|
| INLETS, TYPE ___ | 30 |
| INLETS, TYPE ___, USING EXISTING CASTING | 30 |
| INLETS, TYPE B-___ | 40 |
| INLETS, TYPE B-___, USING EXISTING CASTING | 40 |
| INLETS, TYPE ___ MODIFIED | 40 |
| INLETS, TYPE ___ MODIFIED, USING EXISTING CASTING | 40 |
| INLETS, TYPE ES | 50 |
| INLET CASTINGS, TYPE ES | 40 |
| MANHOLES | 30 |
| MANHOLES, ___ ‘ DIAMETER | 30 |
| MANHOLES, USING EXISTING CASTING | 30 |
| MANHOLES, SANITARY SEWER | 30 |
| MANHOLES, SANITARY SEWER, USING EXISTING CASTING | 30 |
| GRANITE CURB | 25 |
| RESET GRANITE CURB | 25 |
| BEAM GUIDE RAIL ANCHORAGES | 25 |
| CHAIN-LINK FENCE, ___ ‘ HIGH | 25 |

| | |
|---|---|
| CHAIN-LINK FENCE, ALUMINUM-COATED STEEL,___ ‘ HIGH | 25 |
| CHAIN-LINK FENCE, PVC-COATED STEEL,___ ‘ HIGH | 25 |
| CHAIN-LINK FARM-TYPE FENCE | 25 |
| GATES, CHAIN-LINK FENCE, ___ ‘ WIDE | 25 |
| GATES, CHAIN-LINK FENCE, ALUMINUM-COATED STEEL, ___ ‘ WIDE | 25 |
| GATES, CHAIN-LINK FENCE, PVC-COATED STEEL, ___ ‘ WIDE | 25 |
| GATES, CHAIN-LINK FARM-TYPE FENCE, ___ ‘ WIDE | 25 |
| RESET FENCE | 25 |
| TEMPORARY CHAIN-LINK FENCE, ___ ‘ HIGH | 25 |
| GUIDE SIGNS, TYPE GA, BREAKAWAY SUPPORTS | 20 |
| GUIDE SIGNS, TYPE GA, NON-BREAKAWAY SUPPORTS | 20 |

The amount of pay-adjustment for pay items not listed above is the product of the unit bid price times the lot quantity times the percent pay-adjustment given by Equation 1.

THE FOLLOWING IS ADDED:

**G. Mix Design, Fabrication and Furnishing of High Performance Concrete (HPC) for Deck Slabs, Sidewalks, Concrete Railings, Precast Cofferdams, Class A Footings and Prestressed Beams.**

1. **Fabrication Requirements.** For the construction of deck slabs, sidewalks, parapets, bridge monuments, precast concrete coffedams, cast-in-place concrete for pier caps, concrete railings and substructure concrete, high strength precast concrete, the HPC shall be fabricated in accordance with the requirements of these specifications.
2. **Mix Design Verification.** In the development of the HPC mix design, the following performance requirements, in accordance with the indicated test method, shall be achieved. A report to document these results shall be provided to the NJDOT Regional Materials Office. The Contractor shall obtain the results of these standard tests from an AASHTO Accredited testing agency, that is approved for Portland Cement concrete testing, at no cost to the Department.

**Performance Requirements for Deck Slabs, Sidewalks, Concrete Railings**

| Performance Characteristic | Standard Test Method | Performance Required |
|---|---|---|
| Scaling Resistance<br>(x = visual rating of the surface after 50 cycles) | ASTM C 672 | x = 3 max |
| Freeze-Thaw Durability<br>(x = relative dynamic modulus of elasticity after 300 cycles) | AASHTO T 161<br>ASTM C 666<br>Proc. A | x = 80% minimum |
| Chloride Permeability<br>56 days (coulombs) | AASHTO T 277<br>ASTM C1202 | 1000 maximum |
| 56 Day Compressive Strength<br>(Verification Strength) | AASHTO T 22<br>ASTM C 39 | 5400 psi minimum |

**Performance Requirements for Substructure Protection Concrete, Precast Cofferdams, Class A Concrete Footings**

| Performance Characteristic | Standard Test Method | Performance Required |
|---|---|---|
| Abrasion Resistance<br>(x = average depth of wear ) | ASTM C 944 | x = 0.04 inches maximum |
| Freeze-Thaw Durability<br>(x = relative dynamic modulus of elasticity after 300 cycles) | AASHTO T 161<br>ASTM C 666<br>Proc. A | x = 80% minimum |
| Chloride Permeability<br>56 days (coulombs) | AASHTO T 277<br>ASTM C1202 | 1000 maximum |
| 56 Day Compressive Strength<br>(Verification Strength) | AASHTO T 22<br>ASTM C 39 | 5400 psi minimum |

**Performance Requirements for High Strength Precast/Prestressed Concrete**

| Performance Characteristic | Standard Test Method | Performance Required |
|---|---|---|
| Scaling Resistance<br>(x = visual rating of the surface after 50 cycles) | ASTM C 672 | x = 3 maximum |
| Freeze-Thaw Durability<br>(x = relative dynamic modulus of elasticity after 300 cycles) | AASHTO T 161<br>ASTM C 666<br>Proc. A | x = 80% minimum |
| Chloride Permeability<br>56 days (coulombs) | AASHTO T 277<br>ASTM C1202 | 1000 maximum |
| 56 Day Compressive Strength<br>(Verification Strength) | AASHTO T 22<br>ASTM C 39 | Class P-2 7000 psi minimum<br>Class P-4 9000 minimum |

Note: For the Scaling Resistance performance testing, as prescribed in the Standard Test Method, specimens shall be moist cured for 14 days and then air cured for 14 days.

a. If the compressive strength requirement has been achieved in 28 days, the strength requirement shall be considered acceptable. If the required compressive strength is not achieved in 28 days, the HPC sample shall be tested at 56 days.
b. If the chloride permeability requirement has been achieved in 28 days, the chloride permeability shall be considered acceptable. If the required chloride permeability is not achieved in 28 days, the HPC sample shall be tested at 56 days.
c. At least 90 calendar days prior to the planned start of the concrete placement, the mix design shall be submitted for approval and verification in accordance with Subsection 914.02. The submission shall include the results of the required Performance testing specified above.
d. In accordance with the above referenced AASHTO T277 test, at 28 and 56 day intervals, the Department will perform chloride permeability testing to document the quality of the HPC mix design and to verify the results submitted in the above referenced Report.

The Contractor shall submit four (4) additional cylindrical samples to the Department Laboratory, for performance of this testing. These samples shall be 4 inches in diameter and at least 8 inches in length. The test value shall be the result of the average value of tests on two (2) specimens for each mix design. The Contractor shall package and ship or transport the additional test cylinders for permeability verification testing to the Central Laboratory in Trenton, NJ at no additional cost to the State.

**3. Production HPC.**

a. As per the provisions of 501.12, Subpart 5., a plan of operation for placement of the HPC deck slab, shall be submitted for review and approval by the Engineer. Additionally, a pre-placement meeting shall be held at least seven days prior to the start of placement.
b. During production, the components of the mix design shall not be changed in any way from the approved mix design. If for some reason, the components must be changed, the mix design shall be re-verified according to the requirements stated herein.

**4. HPC Acceptance Requirements.**

a. With the exception that compression testing may be conducted at 56 days, the requirements specified in Subsection 914.02 for control and acceptance testing of Class A concrete shall be adhered to in the fabrication of the HPC elements.
b. Testing for the Chloride Permeability requirements stated below will not be performed for the sidewalk, bridge monuments, and parapet HPC.
c. Acceptance testing performance measures shall consists of the following parameters:

**Requirements for Deck Slabs, Sidewalks, Concrete Railings, Substructure Protection Concrete, Precast Cofferdams, Class A Concrete Footings**

| Performance Characteristic | Standard Test Method | Performance Required |
|---|---|---|
| Percent Air Entrainment * | AASHTO T 152 | 6.0 ± 1.5 (#57 Aggregate)<br>6.0 ± 1.5 (#67 Aggregate)<br>7.0 ± 1.5 (#8 Aggregate) |
| Slump (inches) * | | 3 ± 1 |
| Chloride Permeability **<br>56 days (coulombs) | AASHTO T 277<br>ASTM C1202 | 2000 maximum |
| 56 Day Compressive Strength ***<br>(Retest Limit) | AASHTO T 22<br>ASTM C 39 | 4400 psi<br>minimum |

**Requirements for High Strength Precast/Prestressed Concrete**

| Performance Characteristic | Standard Test Method | Performance Required |
|---|---|---|
| Percent Air Entrainment * | AASHTO T 152 | 7.0 ± 1.5 (# 8 Aggregate) |
| Slump (inches) * | AASHTO T 119 | 3 ± 1 |
| Chloride Permeability **<br>56 days (coulombs) | AASHTO T 277<br>ASTM C1202 | 2000 maximum |
| 56 Day Compressive Strength ***<br>(Retest Limit) | AASHTO T 22<br>ASTM C 39 | Class P-2 6400 psi minimum<br>Class P-4 8500 psi minimum |

Notes: * As per the guidance stated in Subsection 501.03, a Type F water-reducing, high range admixture will be permitted in accordance with Subsection 905.02 and Subsection 914.02, Subparts B and C. When a Type F admixture is used, the Slump and Air Content values for the HPC shall be as follows:

Slump: 6 ± 2 inches
Air Content: increase both the target value and tolerance percentages by 0.5

** For chloride permeability testing, 4 additional cylinders shall be provided to the Department Laboratory. Two cylinders each from two randomly selected delivery trucks shall be taken for testing at 28 day and 56 day intervals.

*** For compressive strength testing, the Initial Sampling Rate for the HPC shall be 6/Lot.

d. The HPC shall be a Non-Pay-Adjustment Item. In accordance with the provisions of Subsection 914.02 F., the HPC shall be accepted for strength according to the strength performance requirements stated herein.

e. A test for chloride permeability shall consist of two test specimens. The results of the two specimens shall be averaged to determine the test result. There will be two tests performed on each lot from samples taken from two randomly selected delivery trucks. The Contractor shall package and ship or transport the additional cylinders for permeability acceptance testing to the Central Laboratory in Trenton, NJ at no additional cost to the State.

f. The lot is eligible for 100 percent payment provided that all test results are equal to or below 2000 coulombs.

g. Whenever one or more individual test results exceed 2000 coulombs at 28 days, the lot shall be re-evaluated at the same testing rate at 56 days. If, upon testing at 56 days, one or more individual test results exceed 2000 coulombs, the Engineer may:
   (1) Require the Contractor to remove and replace the defective lot at no cost to the State,
   (2) Permit the Contractor to submit a plan, for approval, for corrective action that is to be performed at no cost to the State.

5. **Surface cracks** Surface cracks that may develop in deck slabs and do not exceed 3/8 inch in depth shall be sealed with a low viscosity epoxy sealer or a low viscosity methacrylate monomer penetrating sealer that is to be approved by the Engineer. Cracks exceeding 3/8 inch in depth shall be repaired by methods that are to be approved by the Engineer. All such corrective work shall be at the Contractor's expense. This sealing of the deck shall be after the deck is sawcut.

**914.04 Sampling and Testing Methods.**
THE FOLLOWING AASHTO TEST METHOD IS ADDED:

| | |
|---|---|
| T303 | Standard Test Method for Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction. |

**914.05 Tables.**
TABLES 914-1, 914-2, 914-3, AND 914-4 ARE CHANGED TO:

**Table 914-1 Requirements for Roadway Concrete Items**

| | Concrete Class | Slump (inch) | Percent Air Entrainment for Coarse Aggregate Size Numbers | | | | |
|---|---|---|---|---|---|---|---|
| | | | 357 | 467 | 57 | 67 | 8 |
| **Cast-in-Place Items** | | | | | | | |
| Surface Course, Bridge Approach Slabs, Bridge Approach Transition Slabs | B | 2±1 | 5.0±1.5 | 5.0±1.5 | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Base Course | B | 2±1 | 5.0±1.5 | 5.0±1.5 | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Inlet and Manhole Walls, Headwalls, Miscellaneous Concrete | B | 3±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Inlet and Manhole Top Slabs, Sidewalks, Driveways, Islands | B | 3±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Slope Gutters, Vertical Curb, Sloping Curb, Barrier Curb and Base | B | 4±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Concrete and White Concrete Vertical, Sloping and Barrier Curb, Concrete and White Concrete Islands | B | 4±1 | ---- | ---- | 7.0±2.0 | 7.0±2.0 | 8.0±2.0 |
| Foundations for: | | | | | | | |
| Inlets and Manholes | B | 3±1 | 6.5 max | 6.5 max | 7.5 max | 7.5 max | 8.5 max |
| Electrical Items | B | 3±1 | ---- | ---- | 7.5 max | 7.5 max | 8.5 max |
| Signs | B | 3±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Junction Boxes | B | 3±1 | ---- | ---- | 7.5 max | 7.5 max | 8.5 max |

**Table 914-1 (Continued)**

| | Concrete Class | Slump (inch) | Percent Air Entrainment for Coarse Aggregate Size Numbers | | | | |
|---|---|---|---|---|---|---|---|
| | | | 357 | 467 | 57 | 67 | 8 |
| **Cast-in-Place Items (continued)** | | | | | | | |
| Footings for Fence Posts, Guide Rail End Treatment | B | 3±1 | ---- | ---- | 7.5 max | 7.5 max | 8.5 max |
| Culverts | A | 3±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Monuments | A | 3±1 | ---- | ---- | 7.5 max | 7.5 max | 8.5 max |
| Slope Protection | B | 2±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| **Precast Items** | | | | | | | |
| Culverts | A | 3±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Inlets and Manholes, Junction Boxes, Headwalls, Reinforced Concrete End Sections (See note 2) | B | 3±1 | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Concrete and White Concrete Barrier Curb | B | 3±1 | ---- | ---- | 7.0±2.0 | 7.0±2.0 | 8.0±2.0 |

Note 1: According to Subsection 501.03, a Type F water-reducing, high range admixture will be permitted according to Subsection 905.02 and Subsection 914.02, Subparts B and C. When a Type F admixture is used, the table Slump and Air Content values for the given concrete item shall be changed as follows:

Slump: 6 ± 2 inches

Air Content: Increase both the target value and tolerance percentages by 0.5.

Note 2: For the items in this category, the slump may be reduced to zero (dry cast) provided that adequate consolidation, acceptable to the Engineer, is achieved.

**Table 914-2 Requirements for Structural concrete Items**

| | Concrete Class | Slump (inch) | Percent Air Entrainment for Coarse Aggregate Size Numbers | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 357 | 4 | 467 | 57 | 67 | 8 |
| **Cast-in-Place Items** | | | | | | | | |
| Unreinforced Footings | B | 3±1 | 6.5 max | 6.5 max | 6.5 max | 7.5 max | 7.5 max | 8.5 max |
| Reinforced Footings | B | 3±1 | ---- | ---- | 6.5 max | 7.5 max | 7.5 max | 8.5 max |
| Abutments, Walls, Solid shaft Piers, Pylons | B | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Concrete/White Concrete Barrier Curb, Bridge | B | 4±1 | ---- | ---- | ---- | 7.0±2.0 | 7.0±2.0 | 8.0±2.0 |
| Piles | B | 3±1 | ---- | ---- | ---- | 7.5 max | 7.5 max | 8.5 max |
| Columns and Caps for piers, Arch spans, Rigid Frames, Culverts | A | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Decks, Sidewalks, Concrete Patch, Parapets, Curbs, Bridge Monuments, HPC Footings | A | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Seal (Tremie) Concrete | S | 7±2 | ---- | ---- | ---- | 7.5 max | 7.5 max | 8.5 max |
| **Prestressed Items** | | | | | | | | |
| Beams | P,P-1, P-2, & P-4 | 2±1 | ---- | ---- | ---- | 5.0±1.5 | 5.0±1.5 | 5.0±1.5 |
| Piles | P | 2±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |

**Table 914-2 (Continued)**

| | Concrete Class | Slump (inch) | Percent Air Entrainment for Coarse Aggregate Size Numbers | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **357** | **4** | **467** | **57** | **67** | **8** |
| Precast Concrete Segmental Units | P-4 | 2±1 | ---- | ---- | ---- | 5.0±1.5 | 5.0±1.5 | 5.0±1.5 |
| Pier Caps | P-4 | 2±1 | ---- | ---- | ---- | 5.0±1.5 | 5.0±1.5 | 5.0±1.5 |
| **Precast Items** | | | | | | | | |
| Crib Wall Members | A | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Piles | B | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Culverts | P | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Modular Bin Units | P | 2±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Noise Barriers | P | 2±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| Precast Cofferdams | A | 3±1 | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |
| **Slip-Form Items** | | | | | | | | |
| Parapet | A | $2\pm{}^{1}/_{2}$ | ---- | ---- | ---- | 6.0±1.5 | 6.0±1.5 | 7.0±1.5 |

Note 1: According to Subsection 501.03, a Type F water-reducing, high range admixture will be permitted according to Subsection 905.02 and Subsection 914.02, Subparts B and C. When a Type F admixture is used, the table Slump and Air Content values for the given concrete item shall be changed as follows:

Slump: 6 ± 2 inches

Air Content: Increase both the target value and tolerance percentages by 0.5.

**Table 914-3 Mix Design Requirements**

| | Class of Concrete | | | | | | |
|---|---|---|---|---|---|---|---|
| | **A** | **B** | **S** | **P** | **P-1** | **P-2** | **P-4** |
| Class Design Strength (28 days, psi Notes 3 and 5) | 4600 | 3700 | 2000 | 5500 | 6000 | 6500 | 8500 |
| Verification Strength (28 days, psi Notes 3 and 5) | 5400 | 4500 | -- | 6000 | 6500 | 7000 | 9000 |
| Maximum Water/Cement Ratio (Note 2) | | | | | | | |
| lb/lb | 0.443 | 0.488 | 0.577 | Note 1 | Note 1 | Note 1 | Note 1 |
| gals/bag | 5.0 | 5.5 | 6.5 | Note 1 | Note 1 | Note 1 | Note 1 |
| Minimum Cement Content | | | | | | | |
| lb/cy | 611 | 564 | 658 | Note 1 | Note 1 | Note 1 | Note 1 |
| Bags/cy | 6.5 | 6.0 | 7.0 | Note 1 | Note 1 | Note 1 | Note 1 |

Note 1: According to PCI Manual. The maximum water/cement ratio when a Type F water-reducing, high range admixture is used according to Tables 914-1 and 914-2 shall be 0.40 lb/lb (4.5 gals/bag).

Note 2: The maximum water/cement ratio for all classes of concrete except for Classes P, P-1 and P-2, when a Type F water-reducing, high range admixture is used according to Tables 914-1 and 914-2, shall be reduced by 0.043 lb/lb (4.5 gals/bag).

Note 3: All concrete test results shall be recorded to the nearest 10 psi.

Note 4: To successfully meet the requirements of this specification, the target production strength must be higher than the Class Design Strength by an amount proportional to the Producer's within-lot standard deviation.

Note 5: The class design strength and verification strength of HPC concrete is at 56 days.

**Table 914-4 Lot Sizes, Sampling Rates and Retest Limits**

| | Class of Concrete | | | | | | |
|---|---|---|---|---|---|---|---|
| | **A** | **B** | **S** | **P** | **P-1** | **P-2** | **P-4** |
| Lot Size (maximum) | One Day's Production | | | One Day's Production of a Single Steam Bed | | | |
| **Pay-Adjustment Items** | | | | | | | |
| Initial Sampling Rate | 5/Lot | 5/Lot | -- | 5/Lot | 5/Lot | 5/Lot | 5/Lot |
| Retest Sampling Rate (minimum) | 5/Lot | 5/Lot | -- | 5/Unit or Load Test | | | |
| **Non-Pay-Adjustment Items** | | | | | | | |
| Initial Sampling Rate | 3/Lot | 2/Lot | 1/Lot | 3/Lot | 3/Lot | 3/Lot | 3/Lot |
| Retest Limit (psi) | 4400 | 3600 | 2000 | 5400 | 5900 | 6400 | 8400 |
| Retest Sampling Rate | 5/Lot | 5/Lot | 5/Lot | 5/Lot | 5/Lot | 5/Lot | 5/Lot |

Note 1: The lot sizes are maximums and, at the option of the Engineer, any lot may be subdivided into two or more smaller lots. When such a subdivision is made, the specified sampling rate applies to each of the smaller lots.

Note 2: An initial strength test result is defined as the average strength of two 4 inch by 8 inch compression test cylinders, cured for 28 days, and tested in the Department Laboratory except for Classes P, P-1, and P-2 cylinders which may be tested at the fabricator's plant under the supervision of the Engineer.

Note 3: A retest result is defined as the strength of an individual test result obtained by coring or other suitable means. If retest is performed by coring, each retest result is defined as the corresponding nominal core strength divided by 0.85.

Note 4: The specified sampling rates shall apply except that no more than one test per truckload or batch of concrete will be required (except for air and slump tests when retempering). It is expected that each structural component will have a representative sample taken. At the option of the Engineer, nonstructural concrete lots consisting of 20 cubic yards or less may be accepted without strength tests.

Note 5: No lot shall include more than one class of concrete nor include concrete of the same class having different specified levels of slump or air entrainment.

Note 6: For prestressed concrete, if more than one bed is used or if more than 80 cubic yards of concrete are used, the production shall be subdivided as equally as possible into two or more lots.

Note 7: Retest limit for non-pay-adjustment roadway and structural items requiring the use of Class B, white concrete, shall be 3000 psi.

Note 8: The initial sampling rate for HPC concrete shall be 6/Lot

## SECTION 915 – REINFORCEMENT STEEL

**915.02 Prestressing Reinforcement.**

**C. Grit Impregnated Epoxy-Coated Prestressing Steel.**

THE FIRST SENTENCE IS CHANGED TO:

Grit impregnated epoxy-coated prestressing steel strands shall conform to the requirements of ASTM A 882 and to the criteria specified in 502.06.

# SECTION 916 - SIGN MATERIALS

**916.04 Retroreflective Sheeting.**
THE ENTIRE SUBSECTION IS CHANGED TO:

As stated herein, the terms reflective sheeting and retroreflective sheeting are synonymous.

Retroreflective sheeting shall conform to ASTM D 4956 based upon results obtained and reported through testing performed by the National Transportation Product Evaluation Program (NTPEP).

1. **General Requirements.a. Retroreflectance.** All retroreflective sheeting shall have the minimum coefficient of retroreflection ($R_A$) in conformance with ASTM D 4956.**b. Color.** The colors of the retroreflective sheeting, except for fluorescent colors shall conform the color requirements of ASTM D 4956.**c**. **Fluorescent Colors.** The daytime fluorescent color of retroreflective sheeting shall be determined according to ASTM E 991.

   In addition, the color shall be equally distinguishable in daylight and at night under artificial headlight illumination. The color shall have a consistent chromaticity across all signs of the same color. Noticeable deviation from the shades that would affect the required performance shall be a cause for rejection of any sheeting or completed sign at any time before acceptance. For sheeting that is directional, the datum mark (arrow) imprinted on the face of the sheeting shall be the datum mark for test purposes.

**d. Product Performance Requirements.** The retroreflective sheeting manufacturer shall meet the following requirements for their products.

(1) Type III Sheeting – Sheeting shall be required to have a service life span of at least 12 years.

(2) Types VI, VII, VIII AND IX Sheeting – Sheeting shall be required to have a service life span of at least 10 years.

(3) The performance requirements shall be such that there is: no loss of retroreflectivity; no loss of colorfastness; no cracking; and no other conditions inherent to the sheeting including inks and overlay film that causes it to be incapable of performing as required.

2. **Certification of Compliance.** The manufacturer shall submit a certification of compliance according to Subsection 106.04 for each lot of sheeting supplied for use on the Project.

**916.05 Legends, Borders, and Accessories.**
THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAPH:

All finished signs shall be clear and legible without smudging, blisters, delamination, loose edges or other blemishes.

**1. Type A Demountable.**
THE FIRST AND SECOND PARAGRAPHES ARE CHANGED TO:

The demountable sign letters, digits, arrows, borders, and alphabet accessories shall be reflectorized and shall consist of ASTM D 4956 Type VIII OR IX wide angle prismatic retroreflective sheeting applied to ⅜-inch cutout aluminum plates conforming to ASTM B 209, Alloy 6061-T6 or 5052.

All shields and symbols to be mounted to sign types GO, GOX, and GA on breakaway tubular posts shall consist of ASTM D 4956 Type VIII OR IX wide angle prismatic retroreflective sheeting applied to 3/16-inch cutout aluminum plates conforming to ASTM B 209, Alloy 6061-T6.

**2. Type B Direct and Permanently Applied Retroreflective Sheeting Copy.**
SUBPART D, E, & F ARE DELETED AND C IS CHANGED TO:

c. When the background is ASTM D 4956 Type III sheeting, ASTM D 4956 Type III sheeting shall be used for copy.

**916.08 Fabrication.**

**8. Shop Painting and Reflectorization.**

**a. Application.**

THE LAST SENTENCE IN THE THIRD PARAGRAPH IS CHANGED TO:

Sheeting applied to extruded sections shall extend over top edges and down side legs a minimum of 1/16 inch; except that where ASTM D 4956 Type VIII or IX sheeting is used, it shall be cut at the top edges according to the manufacturer's recommendation.

**c. Screen Process Printing.**

THE THIRD SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Transparent screen process paint, after application to the retroreflective sheeting and thoroughly dry shall conform to the color requirements ASTM D 4956.

**9. Packaging, Storage, and Shipping.**

THE FIRST SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Packaging, storage, and shipping of signs produced using retroreflective sheeting shall be according to the sheeting manufacturer's recommendations.

**916.10 Breakaway Steel "U" Post Sign Supports.**

THE HEADING AND ENTIRE SUBSECTION TEXT IS CHANGED TO:

**916.10 Steel "U" Post Sign Supports.**

The steel "U" post sign supports shall conform to ASTM A499. Signs shall be secured to the steel "U" post by means of 18-8 stainless steel 5/16 x 18 UNC hexagonal headed bolts and nuts conforming to ASTM A 320, Grade B8, Class 1. Sign mounting bolts shall extend beyond the end of each nut but not more than ¾ inches when fully tightened.

The steel "U" posts shall be straight and have a smooth finish, free of burrs.

The list of the approved products will be provided by the Bureau of Materials Engineering and Testing.

**916.14 Flexible Delineators.**

**2. Composition.**

THE FIRST PARAGRAPH IS CHANGED TO:

For ground mounted flexible delineators, the portion of the delineator above ground shall be one component, or shall be bonded together if it consists of two or more components. The shape of the delineator post where the retroreflective sheeting is applied shall have a cross section that protects the sheeting from abrasion upon impact.

**10. Mowability.**

THE ENTIRE SUBPART IS DELETED.

**11. Sampling Rate**

THE SUBPART NUMBER IS CHANGED TO:

**10. Sampling Rate.**

**916.17 Tables.**

THE ENTIRE SUBSECTION IS DELETED.

## SECTION 917 – STRUCTURAL STEEL AND OTHER FERROUS METALS

**917.01 Bolts and Bolting Material.**

**2. Specifications.**

THE FOLLOWING IS ADDED:

c. Direct Tension Indicators shall comply with ASTM F 959 and shall be accepted and installed according to Test Method S-3, "Procedure for Identification and Installation of High Strength Bolts with Direct Tension Indicators (DTI's)".

**3. Manufacturing.**

**a. Bolts.**

THE FIRST SENTENCE IS CHANGED TO:

Hardness for bolt diameters ¼ inch to 1 ½ inches, inclusive, shall be as noted:

THE FOLLOWING IS ADDED:

When atmospheric corrosion resistant weathering steel is to be used, Type 3 bolts shall be used.

THE FOLLOWING IS ADDED:

**d. Direct Tension Indicators (DTI's).** When galvanizing of the bolt assembly is required, DTI's shall be mechanically galvanized in accordance with AASHTO M 298, Class 50 (ASTM B 695, Class 50). DTI's to be used for Type 3 bolts shall be epoxy coated with a black color.

**4. Testing.**

THE FOLLOWING IS ADDED:

**g. Direct Tension Indicators (DTI's).** DTI's shall be tested according to ASTM F 959.

**7. Installation.**

THE SUBPART A. IS CHANGE TO:

a. Bolts shall be installed according to the appropriate AASHTO Specifications. Direct Tension Indicators (DTI's) shall be used with high strength bolts to verify the required tension. The provisions of Article 11.5.6.4.7 of Division II of the AASHTO Standard Specifications or of Article 11.5.6.4.7 of the AASHTO LRFD Bridge Construction Specifications shall be followed. If warranted and as directed by the Engineer, the face of the nut shall be smeared with wax before it is installed. The Castral Stick Wax lubricant, beeswax or a water wax emulsion; such as, the MacDermid "Torque 'N Tension Control Fluid" may be used.

THE FOLLOWING IS ADDED AT THE END OF THE SUBSECTION:

Anchor bolts, rock anchors, and hardware shall conform to AASHTO M 270 Grade 36 and shall be galvanized after fabrication, including threading, according to ASTM A 153.

Dowels used to anchor prestressed concrete voided slabs and box beams to abutments and piers shall conform to AASHTO M 270 Grade 36 and shall be galvanized to ASTM A 153. Threading of dowels is not required.

Welded steel shear connectors shall conform to Division II, Section 11 of the AASHTO Standard Specifications for Highway Bridges or Section 11 of the AASHTO LRFD Bridge Construction Specifications.

Stainless steel bolts, nuts, and washers shall conform to ASTM A 320, Class 1, Grade B8 (AISI Type 304).

For overhead and cantilever sign support structures, bolts, nuts and washers for steel to steel chord splices shall conform to AASHTO M 164 and be hot-dip galvanized as per ASTM A 153.

As an alternate, bolts, nuts and washers conforming to AASHTO M 164 may be substituted for bolts, nuts, and washers of the same diameter, length, and thickness conforming to ASTM A 307.

**917.03 Castings, Materials and Components for Drainage Structures.**

THE FIRST PARAGRAPH IS CHANGED TO:

All inlet and manhole castings, grates, extension rings, extension frames and covers shall be capable of withstanding the proof load testing requirements specified in AASHTO M 306 when they are tested as a complete assembled unit and shall conform to the following:

# SECTION 919 - MISCELLANEOUS

**919.02 Bearing Pads.**

**A. Elastomeric Bearing Pads.**

THE FIRST PARAGRAPH IS CHANGED TO:

Elastomeric bearing pads for bridge beams shall conform to Division II, Section 18 of the AASHTO Standard Specifications for Highway Bridges or Section 18 of the AASHTO LRFD Bridge Construction Specifications.

**919.06 Geotextiles.**

THE FOLLOWING IS ADDED TO THE LIST OF USES FOR GEOTEXTILES AFTER ITEM 3:

**4. Channel Lining.**

Geotextiles used as channel lining shall be a permanent type turf reinforcement mat, be able to withstand the cutting necessary for bulb planting, and have a long-term unvegetated permissible shear stress of 2.0 lbs/ft2. The permanent turf reinforcement mat shall be constructed of 100% UV stabilized 565 denier polypropylene fiber sewn between a black UV stabilized 0.50 x 0.50 inch mesh polypropylene netting on top (5 lbs/1,000 ft2) and a black UV stabilized 0.625 x 0.625 inch mesh polypropylene netting on the bottom (3 lbs/1,000 ft2). The mat is sewn together using UV stable polypropylene thread stitched on 1.50 inch centers. The mat is to be highly resistant to biological degradation. The mat shall exhibit the following physical properties:

| Physical Property | Test Method | Requirements |
|---|---|---|
| Thickness | ASTM D6525 | 0.54in |
| Resiliency | ASTM D1777 | 91.50% |
| Density | ASTM D792 | 0.513oz/in$^3$ |
| Mass per Unit Area | ASTM D6566 | 11.46 oz/yd$^2$ |
| Porosity | ECTC Guidelines | 95.89% |
| Open Volume per Unit Area | ECTC Guidelines | 872in$^3$/yd$^2$ |
| Stiffness | ASTM D1388/ECTC | 97.24 oz-in |
| Light Penetration | ECTC Guidelines | 15% |
| UV Stability | ASTM 4355 | 90% |
| MD Tensile Strength | ASTM D6818 [D5035] | 481 lbs/ft [379 lbs/ft] |
| MD Elongation | ASTM D6818 [D5035] | 20% [26%] |
| TD Tensile Strength | ASTM D6818 [D5035] | 426 lbs/ft [403 lbs/ft] |
| TD Elongation | ASTM D6818 [D5035] | 23% [27%] |

MD – Machine Direction
TD – Transverse Direction

**919.07 Fly Ash.**

THE FIRST PARAGRAPH IS CHANGED TO:

Fly ash for portland cement concrete shall conform to ASTM C 618, Class C or Class F except that the loss on ignition shall not be more than three percent. Fly ash used to control alkali-silica reactivity shall be Class F. Before each source of fly ash is approved, certified results of tests conducted by a testing agency shall be submitted to and verified by the Department. Accompanying the certification shall be a statement from the supplier listing the source and type of coal, the methods used to burn, collect, and store the fly ash, and the quality control measures employed.

**919.11 Portland Cement.**

THE TITLE AND SUBSECTION ARE CHANGED TO:

**919.11 Portland or Blended Hydraulic Cement.**

Portland cement shall conform to the following:

| | |
|---|---|
| Masonry Cement | ASTM C 91 |
| Portland Cement, Type I, II, and Type III (see Note 1) | ASTM C 150 |
| White Portland Cement, Type I and III (see Note 2) | ASTM C 150 |
| Blended Hydraulic Cement (see Note 3) | ASTM C 595 |

Note 1: Type III may be used only for prestressed or precast items.

Note 2: Shall not contain more than 0.55 percent by weight of ferric oxide ($Fe_2O_3$).

Note 3: Only types IS, I(PM), and I(SM) may be used. Portland cement, may be pre-blended with a maximum of 15 percent fly ash, by weight, or a maximum of 10 % silica fume by weight, or with a maximum of 50% GGBFS by weight. If more than 30% GGBFS is used, a scaling test conforming to ASTM C 672 must be completed on the mix design and the concrete must have a visual rating less than 3 as based on ASTM C672 10.1.5 after 50 cycles.

When blended portland cement is used, no additional mineral admixtures shall be added.

Different brands of cement, the same brand of cement from different mills or different types of cement shall not be mixed.

Suitable means shall be provided for storing and protecting the cement against dampness. Cement which for any reason has become partially set or which contains lumps of caked cement will be rejected. The temperature of the cement at the time of delivery to the mixer shall not exceed 160 °F.

**919.18 Ground, Granulated Blast Furnace Slag.**

THE SECOND PARAGRAPH IS CHANGED TO:

Ground, granulated blast furnace slag may be used as a replacement for portland cement as specified in Subsection 919.11 up to a maximum replacement level of 50 percent by weight. Replacement of portland cement greater than 30 percent will require a scaling test on the mix design conforming to ASTM C 672 with a visual rating less than 3.

**919.19 Sampling and Testing Methods**

THE FOLLOWING ARE ADDED:

| | |
|---|---|
| Mineral Admixtures | 8 pounds from each source |
| Blended Hydraulic Cement | ASTM C 595 |

THE FOLLOWING NEW SUBSECTION IS ADDED:

**919.22 Controlled Low Strength Material (CLSM).**

CLSM shall conform to the following:

| | |
|---|---|
| Fine Aggregate | 901.12 |
| Chemical Admixtures | 905.02 |
| Portland Cement, Type I, II, III | 919.11 |
| Water | 919.15 |

CLSM shall consist of a mixture of portland cement, water, fine aggregate and chemical admixtures. Fly ash shall not be permitted in mixes intended for trench backfilling. The CLSM mixture shall be proportioned to provide a backfill material that is self-compacting and capable of being excavated with hand tools at a later date. CLSM shall be proportioned to produce a 28-day compressive strength of 50 to 150 pounds per square inch. An accelerating admixture shall be used to produce a fast setting flowable mixture as required. The CLSM shall have a permeability of $1.7 \times 10^{-3} \pm 0.2 \times 10^{-3}$ centimeters per second according to ASTM D5084 for backfilling of conduits and piping.

At least 45 days prior to the start of any CLSM placement, trial batches of CLSM shall be prepared of the same materials and proportions proposed for use on the project. Each mix design shall be submitted on portland cement concrete mix design forms furnished by the Department, naming the sources of materials and test data.

Department personnel will be present at the time of verification batching to confirm that the proportions and materials batched are according to the proposed mix designs. At least six 6 X 12 inch compression test cylinders shall be prepared for each batch according to ASTM 5971-96 for 28-day strengths except for fast setting mixes, which shall be tested at the specified cure time.

THE FOLLOWING NEW SECTIONS ARE ADDED:

# SECTION 921 – FIBERGLASS REINFORCED PLASTIC LUMBER

The furnishing of Fiberglass Reinforced Plastic Lumber (FRPL) shall conform to the following material properties:

**1. Plastic**. The plastic for FRPL shall be a mixture of one or more of the following recycled post consumer or post industrial thermoplastics: high-density polyethylene, medium-density polyethylene or, low-density polyethylene. The plastic shall be mixed with appropriate colorants, UV inhibitors and antioxidants so that the resulting product meets the material property requirements specified in Table 1 below.

FRPL shall not absorb moisture, corrode, rot, warp, splinter or crack. The outer skin shall be smooth and black in color unless otherwise specified in the contract plans. It shall contain hindered amine light stabilizers to provide sufficient resistance to ultraviolet light degradation so as to meet the requirements in Table 1 below.

**2. Manufacturing**. Manufacture FRPL as one continuous piece with no joints or splices to the dimensions and tolerances in accordance with Table 2 and consisting of a dense outer skin surrounding a less dense core. Interior voids shall not exceed 0.75 inch in diameter. FRPL shall be free of twist and curvature.

**3. Reinforcement**. FRPL shall be reinforced by fiberglass reinforcing rods spaced inside the four corners of the timber. Reinforce 12”x12” FRPL with a minimum of four 1.625 inch diameter reinforcing rods placed in the corners of the section. Reinforce 8”x12” FRPL with a minimum of four 1.0 inch diameter reinforcing rods placed in the corners of the section. Reinforce 3”x8” and 3”x10” FRPL with a minimum of two 0.75 inch diameter reinforcing rods placed in the corners of the section. Reinforcing rods must be continuous and offer a minimum flexural strength of 70 ksi when tested in accordance with ASTM D 4476 and a minimum compressive strength of 40 ksi when tested in accordance with ASTM D 695. Steel reinforcing rods shall not be permitted. All FRPL used for constructing platforms, blocking and wales shall have a minimum of 15% (by weight) chopped glass reinforcement added to the polyethylene. No fiberglass rebar will be required for the smaller dimensional FRPL.

**4. Structural Properties**. 12”x12”, 8”x12”, 3”x8” and 3”x10” FRPL shall meet the minimum structural properties (+/- 10%) listed in Tables 3A, 3B, 3C and 3D. Smaller, dimensional FRPL for platforms and blocking shall meet the minimum structural properties listed in Table 4.

**TABLE 1: PLASTIC MATERIAL PROPERTIES**

| | | |
|---|---|---|
| Density (ASTM D792) | Skin | 55-63-lbs/$ft^3$ |
| Density (ASTM E1547) | Core | 34-48-lbs/$ft^3$ |
| Water Absorption (ASTM D570) | Skin | 2 hrs: <1.0% wt. increase<br>24 hrs: <3.0% wt. increase |
| Brittleness (ASTM D746) | Skin | No break at -40$^oF$ |
| Impact Resistance (ASTM D746) | Skin | Greater than 4 ft-lbs/inch |
| Hardness (ASTM D2240) | Skin | 44-75 (Shore D) |
| Abrasion (ASTM D4060)<br>Cycles = 10,000<br>Wheel = CS17<br>Load – 2.2 lbs | Skin | Weight Loss: <0.03g<br>Wear Index: 2.5 to 3.0 |
| Chemical Resistance (ASTM D543) | Skin/Core<br>Sea Water<br>Gasoline<br>No. 2 Diesel | <br><1.5% weight increase<br><7.5% weight increase<br><6.0% weight increase |
| Tensile Properties (ASTM D638) | Skin/Core | Minimum 500 psi at break |
| Compressive Modulus (ASTM D695) | Skin/Core | Minimum 40 ksi |
| Coefficient of Friction (ASTM F489) | Skin | Maximum 0.25, wet or dry |
| Nail Pull-Out (ASTM D1761) | Skin/Core | Minimum 60 lbs |

**TABLE 2: DIMENSIONS AND TOLERANCES**

| Plastic Timber | Dimension | Tolerance |
|---|---|---|
| Length | Per order | ± 6 in |
| Width | See Contract Plans | ± 0.25 in |
| Height | See Contract Plans | ± 0.25 in |

| | | |
|---|---|---|
| Corner Radius | 1.75 inches | ± 0.25 in |
| Outer Skin Thickness | 0.1875 inches | ± 0.125 in |
| Distance from outer surface to rebar elements | 1.5 inches | ± 0.625 in |
| Straightness (gap, bend or bulge inside while lying on a flat surface) | | <1.5 in per 10 ft length |

**TABLES 3-A, 3-B, 3-C and 3-D: STRUCTURAL PROPERTIES**

| Table 3-A | |
|---|---|
| Member Size | 12 in x 12 in |
| Modulus of Elasticity as derived below | 452 ksi |
| Stiffness, E.I. | 7.34E+08 lb-in$^2$ |
| Yield Stress in Bending | 4.91 ksi |
| Weight | 42-52 lbs/ft |

| Table 3-B | |
|---|---|
| Member Size | 8 in x 12 in |
| Modulus of Elasticity as derived below | 369 ksi |
| Stiffness, E.I. | 3.66E+08 lb-in$^2$ |
| Yield Stress in Bending | 3.8 ksi |
| Weight | 28-34 lbs/ft |

| Table 3-C | |
|---|---|
| Member Size | 3 in x 8 in |
| Modulus of Elasticity as derived below | 463 ksi |
| Stiffness, E.I. | 4.07E+07 lb-in$^2$ |
| Yield Stress in Bending | 8.18 ksi |
| Weight | 7-9 lbs/ft |

| Table 3-D | |
|---|---|
| Member Size | 3 in x 10 in |
| Modulus of Elasticity as derived below | 490 ksi |
| Stiffness, E.I. | 8.77E+07 lb-in$^2$ |
| Yield Stress in Bending | 7.46 ksi |
| Weight | 9-12 lbs/ft |

5. **Modulus of Elasticity**. Determine the Modulus of Elasticity of a full size specimen by conducting a three point bend test with a load applied in the center of a simply supported fourteen foot span at a deflection rate of 0.25 inches per minute. The Modulus is to be taken at a strain of 0.01 inches per inch, where strain equals (6) x (depth of cross section) x (deflection) / (span length squared) and where Modulus of Elasticity equals (load) x (span length cubed) / [(48) x (deflection) x (moment of inertia)].

**TABLE 4: STRUCTURAL PROPERTIES**

| Table 4 | |
|---|---|
| Modulus of Elasticity (ASTM D6109) | 175,000 psi |
| Flexural Strength (ASTM D6109) | No fracture at 1,800 psi |
| Compressive Strength (ASTM D6108) | 1,500 psi |
| Compressive Strength Parallel to Grain (ASTM D6112) | 1,750 psi |
| Compressive Strength Perpendicular to Grain | 600 psi |

| Table 4 | |
|---|---|
| (ASTM D6112) | |
| Screw Withdrawal (ASTM D6117) | 350 lbs |

The approved manufacturers of FRPL products are listed on the following website:

http://www.state.nj.us/transportation/eng/technology/materials

## SECTION 922 – FIBERGLASS REINFORCED PLASTIC PILES

The furnishing of Fiberglass Reinforced Plastic Piles (FRPP) shall conform to the following material properties:

**1. Plastic**. The plastic for FRPP shall be a mixture of one or more of the following recycled post consumer or post industrial thermoplastics: high-density polyethylene, medium-density polyethylene or, low-density polyethylene. The plastic shall be mixed with appropriate colorants, UV inhibitors and antioxidants so that the resulting product meets the material property requirements specified in Table 1 below.

FRPP shall not absorb moisture, corrode, rot, warp, splinter or crack. The outer skin shall be smooth and black in color unless otherwise specified in the contract plans. It shall contain hindered amine light stabilizers to provide sufficient resistance to ultraviolet light degradation so as to meet the requirements in Table 1 below.

**2. Manufacturing**. Manufacture FRPP as one continuous piece with no joints or splices to the dimensions and tolerances in accordance with Table 2 and consisting of a dense outer skin surrounding a less dense core. Interior voids shall not exceed 0.75 inch in diameter. FRPP shall be free of twist and curvature.

**3. Reinforcement**. FRPP shall be reinforced by fiberglass reinforcing rods spaced evenly around the inside perimeter of the pile. Reinforce 10" OD FRPP with a minimum of six 1.25-inch diameter fiberglass reinforcing rods. Reinforce 16" OD FRPP with a minimum of sixteen 1.375" diameter fiberglass-reinforcing rods. Reinforcing rods must be continuous and offer a minimum flexural strength of 70 ksi when tested in accordance with ASTM D 4476 and a minimum compressive strength of 40 ksi when tested in accordance with ASTM D 695. Steel reinforcing rods shall not be permitted. All FRPP shall have a minimum of 5% (by weight) chopped glass reinforcement added to the polyethylene.

**4. Structural Properties**. 10" OD and 16" OD FRPP shall meet the minimum structural properties (+/- 10%) listed in Tables 3A and 3B. The Modulus of Elasticity shall be determined by the test procedure found in Section 6.

**5. Recoverable Deflection**. FRPP shall exhibit recoverable deflection. FRPP shall not exhibit more than a 5% reduction in bending stiffness (EI) when cyclically load tested. The manufacturer of the FRPP shall provide cyclical, flexural load test results from an independent test laboratory. Cyclical load testing shall be conducted on the specified 16" O.D. FRPP. The test shall be for a minimum of 200 load cycles. The test shall be a four-point load condition with a minimum 30.5' clear span and a minimum 15' shear span. The applied load shall produce a minimum of 40% of the FRPP's bending moment at yield. The bending moment at yield shall be determined by the formula M = f (I / c) where:

M = bending moment at yield (in·lbs)
f = yield stress in bending (lb/in$^2$)
I = moment of inertia of cross-section (in$^4$)
c = distance from neutral axis to point where stress is desired (inches)

**TABLE 1: PLASTIC MATERIAL PROPERTIES**

| | | |
|---|---|---|
| Density (ASTM D792) | Skin | 55-63-lbs/ft$^3$ |
| Density (ASTM E1547) | Core | 34-48-lbs/ft$^3$ |
| Water Absorption (ASTM D570) | Skin | 2 hrs: <1.0% wt. increase<br>24 hrs: <3.0% wt. increase |
| Brittleness (ASTM D746) | Skin | No break at -40$^o$F |
| Impact Resistance (ASTM D746) | Skin | Greater than 4 ft-lbs/inch |
| Hardness (ASTM D2240) | Skin | 44-75 (Shore D) |
| Abrasion (ASTM D4060)<br>Cycles = 10,000<br>Wheel = CS17<br>Load – 2.2 lbs | Skin | Weight Loss: <0.03g<br>Wear Index: 2.5 to 3.0 |
| Chemical Resistance (ASTM D543) | Skin/Core<br>Sea Water<br>Gasoline<br>No. 2 Diesel | <br><1.5% weight increase<br><7.5% weight increase<br><6.0% weight increase |
| Tensile Properties (ASTM D638) | Skin/Core | Minimum 500 psi at break |
| Compressive Modulus (ASTM D695) | Skin/Core | Minimum 40 Ksi |
| Coefficient of Friction (ASTM F489) | Skin | Maximum 0.25, wet or dry |
| Nail Pull-Out (ASTM D1761) | Skin/Core | Minimum 60 lbs |

**TABLE 2: DIMENSIONS AND TOLERANCES**

| FRPP | Dimension | Tolerance |
|---|---|---|
| Length | Per order (105 ft. max) | +6.0 in. / -0.0 in. |
| Outside Diameter | 10.000 in./12.875 in./ 16.250 in. | ± 0.375 in. |
| Outer Skin Thickness | 0.1875 in. / 0.1875 in./ 0.1875 in. | ± 0.125 in. |
| Distance from outer surface to rebar elements (SFRPP) | 0.880 in./0.750 in. / 1.250 in. | ± 0.375 in. |
| Straightness (gap, bend or inside while lying on a flat surface) | | <1.5 inches per 10 feet |

**TABLES 3-A and 3-B: STRUCTURAL PROPERTIES**

| Table 3-A | |
|---|---|
| Member Size | 10” OD |
| Modulus of Elasticity as derived below | 622 ksi |
| Stiffness, E.I. | 3.06E+08lb-in$^2$ |
| Yield Stress in Bending | 5.84 ksi |
| Bending Moment at Yield | 573 in-kips |
| Weight | 25-31 lbs/ft |

| Table 3-B | |
|---|---|
| Member Size | 16” OD |
| Modulus of Elasticity as derived below | 997 ksi |
| Stiffness, E.I. | 3.21E+09 lb-in$^2$ |
| Yield Stress in Bending | 7.8 ksi |
| Bending Moment at Yield | 3168 in-kips |
| Weight | 66-81 lbs/ft |

6. **Modulus of Elasticity**. The Modulus of Elasticity shall be determined by the following test procedure:

   a.) Place a 54-foot long standard commercial type FRPP in a clamping device so that 6 feet of the piling will be firmly fixed and unable to move.
   b.) The opposite end is to simply supported.
   c.) Gradually apply a vertical (downward) load at a point that is 12 feet from the simply supported end.
   d.) Measure the deflection along the length of the piling at the load point, and 3 equidistant locations.
   e.) Use the load and deflection data to calculate the flexural modulus of elasticity, maximum outer fiber stress, stiffness (EI), and the bending stress.
   f.) The flexural modulus of elasticity is calculated by dividing EI by the moment of inertia of the cross section of the product.

   Calculate the properties in Table 3A and 3B utilizing standard elastic beam flexure formulas (as found in references such as Machinery's Handbook; and Formulas for Stress and Strain, by Roark and Young). Report the Stiffness (EI) as the average of the stiffness at all measurement locations, between zero load and half the load corresponding to the specification yield stress. The specified minimum yield stress in bending shall be reached before failure of the product. Calculate the stress at the load point, on the tension side of the plastic composite marine piling.

   As stated, conduct the tests on a full-scale product of the specified size. The results of these tests may be extended through engineering calculations, to a product of another size only if the other size has the same or smaller cross section than the tested product. Do not use smaller cross sections to predict the performance of larger cross sections.

7. **Wrapping**. Wrapping for the FRPP that are to be placed in clusters shall be 0.5" diameter steel cable (5/8" OD covering) polypropylene impregnated wire rope.

   The approved manufacturers of FRPP products are listed on the following website:

   http://www.state.nj.us/transportation/eng/technology/materials

## SECTION 990 - METHODS OF TESTS

THE FOLLOWING TEST METHODS ARE ADDED:

## B-10 TEST METHOD TO DETERMINE ASPHALT CONTENT FOR MODIFIED OPEN GRADED FRICTION (MOGFC) COURSES BY AGGREGATE SURFACE AREA

### A. Scope.

This test method is used to determine the percentage of asphalt to be used in MOGFC mixes based on the surface area of the aggregate. This percentage is averaged with asphalt contents determined as per Section 990, NJDOT B-11 to arrive at a design asphalt content for a MOGFC mix design.

### B. Apparatus and Materials.

1. Ovens capable of maintaining temperatures of 140 ± 5 °F (60 ± 3 °C) and 230 ± 9 °F (110 ± 5 °C).
2. Balance meeting the requirements of AASHTO M 231, Class D.
3. Two metal funnels having minimum dimensions of 3 ½ in. (90 mm) top diameter, 4 ½ in. (115mm) high and ½ in. (13 mm) orifice. The funnels shall have a metal strainer soldered where the base of the cone connects to the top of the spout. The equivalent size of the strainer shall not be larger than No. 10 (2.00 mm) sieve.
4. A 3/8 in. (9.5 mm) sieve and a No. 4 (4.75 mm) sieve.
5. S.A.E. No. 10 lubricating oil.
6. Two rubber stoppers to fit the funnel outlets.
7. Ring stand to support the funnels during testing.

### C. Procedure.

**OIL RETENTION**

1. Through quartering, obtain two samples weighing approximately 105 g representative of the material passing the 3/8 in. (9.5 mm) sieve and retained on the No. 4 (4.75 mm) sieve.
2. Dry the sample in the 230 °F (110 °C) oven to a constant weight and allow to cool to room temperature.
3. Weigh out 100.0 g of the material and place in the metal funnel.
4. Place a stopper in the funnel outlet and fill funnel with S.A.E. No. 10 oil, completely immersing the aggregate.
5. After 5 minutes, remove the stopper and allow the oil to drain for 2 minutes.
6. Place the funnel containing the aggregate in the oven maintained at 140 °F (60 °C) for 15 minutes of additional draining.
7. Remove the sample from the funnel, cool to room temperature, reweigh to the nearest 0.1 g and record.

**SPECIFIC GRAVITY**

1. Determine the Apparent Specific Gravity of the aggregate passing the 3/8 in. (9.5 mm) sieve and retained on the No. 4 (4.85 mm) sieve according to AASHTO T 85.

**D. Calculations.**

1. Calculate the percent oil retained for each sample as follows:

$$R = \frac{B - A}{A} \times 100$$

where:
R = percent oil retained
A = weight of sample before test
B = weight of sample after test

2. Using the average percent oil retained of the two samples, calculate the corrected percent oil retained as follows:

$$R_c = \frac{R \times G_a}{2.65}$$

where:
$R_c$ = corrected percent oil retained
$G_a$ = apparent specific gravity of aggregate
2.65 = constant

3. Using the corrected percent oil retained, determine the surface constant ($K_c$) from the attached chart.

4. Calculate the design asphalt content as follows:

$$\text{Design Asphalt Content} = \frac{(2.0\ K_c + 4.0) \times 2.65}{G_a}$$

**DETERMINATION OF SURFACE CONSTANT $K_c$**

| CORR. %OIL | $K_c$ | CORR. %OIL | $K_c$ | CORR. %OIL | $K_c$ | CORR. %OIL | $K_c$ |
|---|---|---|---|---|---|---|---|
| 0.1 | 0.1 | 2.6 | 1.2 | 5.1 | 2.2 | 7.6 | 3.1 |
| 0.2 | 0.1 | 2.7 | 1.2 | 5.2 | 2.2 | 7.7 | 3.1 |
| 0.3 | 0.2 | 2.8 | 1.2 | 5.3 | 2.2 | 7.8 | 3.2 |
| 0.4 | 0.2 | 2.9 | 1.3 | 5.4 | 2.3 | 7.9 | 3.2 |
| 0.5 | 0.3 | 3.0 | 1.3 | 5.5 | 2.3 | 8.0 | 3.2 |
| 0.6 | 0.3 | 3.1 | 1.4 | 5.6 | 2.3 | 8.1 | 3.3 |
| 0.7 | 0.4 | 3.2 | 1.4 | 5.7 | 2.4 | 8.2 | 3.3 |
| 0.8 | 0.4 | 3.3 | 1.4 | 5.8 | 2.4 | 8.3 | 3.4 |
| 0.9 | 0.4 | 3.4 | 1.5 | 5.9 | 2.5 | 8.4 | 3.4 |
| 1.0 | 0.5 | 3.5 | 1.5 | 6.0 | 2.5 | 8.5 | 3.4 |
| 1.1 | 0.5 | 3.6 | 1.6 | 6.1 | 2.5 | 8.6 | 3.5 |
| 1.2 | 0.6 | 3.7 | 1.6 | 6.2 | 2.6 | 8.7 | 3.5 |
| 1.3 | 0.6 | 3.8 | 1.6 | 6.3 | 2.6 | 8.8 | 3.5 |
| 1.4 | 0.7 | 3.9 | 1.7 | 6.4 | 2.6 | 8.9 | 3.6 |
| 1.5 | 0.7 | 4.0 | 1.7 | 6.5 | 2.7 | 9.0 | 3.6 |
| 1.6 | 0.7 | 4.1 | 1.8 | 6.6 | 2.7 | 9.1 | 3.6 |
| 1.7 | 0.8 | 4.2 | 1.8 | 6.7 | 2.8 | 9.2 | 3.7 |
| 1.8 | 0.8 | 4.3 | 1.8 | 6.8 | 2.8 | 9.3 | 3.7 |
| 1.9 | 0.9 | 4.4 | 1.9 | 6.9 | 2.8 | 9.4 | 3.8 |
| 2.0 | 0.9 | 4.5 | 1.9 | 7.0 | 2.9 | 9.5 | 3.8 |
| 2.1 | 1.0 | 4.6 | 2.0 | 7.1 | 2.9 | 9.6 | 3.8 |
| 2.2 | 1.0 | 4.7 | 2.0 | 7.2 | 2.9 | 9.7 | 3.9 |
| 2.3 | 1.0 | 4.8 | 2.0 | 7.3 | 3.0 | 9.8 | 3.9 |
| 2.4 | 1.1 | 4.9 | 2.1 | 7.4 | 3.0 | 9.9 | 3.9 |
| 2.5 | 1.1 | 5.0 | 2.1 | 7.5 | 3.1 | 10.0 | 4.0 |

## B-11 TEST METHOD TO DETERMINE THE OPTIMUM ASPHALT CONTENT FOR MODIFIED OPEN GRADED FRICTION COURSE (MOGFC) MIXES.

**A. Scope.**

This test method is used to determine gradation and the percentage of asphalt in a MOGFC mixture using polymer modified binder and stabilizing fibers. The gradation is verified to ensure stone-on-stone contact, and the impact resistance of the final job mix formula (JMF) is verified. The optimum asphalt content (AC) is determined from: (1) aggregate surface area, (2) relative Voids in Mineral Aggregate (VMA), and (3) visual drain-down determination of asphalt content. A simple average of these three criteria is used to determine the JMF asphalt content.

**B. Apparatus.**

1. Equipment as needed for AASHTO T 19
2. Equipment as needed for Superpave mix design as specified in AASHTO R 35 and T 312.
3. Equipment as needed for Section 990, NJDOT B-10.
4. Ovens capable of maintaining temperatures as specified in this method.
5. Clear, glass (Pyrex) 9" diameter pie pans.
6. L.A. Abrasion Machine conforming to AASHTO T 96.

**C. Procedure.**

**1. Verification of Stone-On-Stone Contact -** The design gradation is chosen to meet minimum air void requirements and to ensure that the aggregate skeleton exhibits stone-on-stone contact.

1.1 For the selected JMF gradation determine the unit weight $G_{uwca}$ of the coarse aggregate fraction of the aggregate using the dry rodding technique according to AASHTO T 19. The coarse aggregate fraction is the aggregate from the final JMF retained on the No. 4 sieve. From $G_{uwca}$ calculate voids in coarse aggregate fraction $VCA_{drc}$.

1.2 For the selected JMF determine the voids in the coarse aggregate of the mix,($VCA_{mix}$).

1.3 Calculations:

$VCA_{drc} = 100 (G_{sbca}-G_{uwca}) / G_{sbca}$

Where:

$VCA_{drc}$ = the voids in the coarse aggregate fraction of the JMF aggregate skeleton.

$G_{sbca}$ = the bulk specific gravity of the coarse aggregate fraction as determined by AASHTO T 85.

$G_{uwca}$ = the unit weight of the coarse aggregate fraction (expressed in kilograms per cubic meter) as determined by AASHTO T 19.

$VCA_{mix} = 100 - (P_{ca} x G_{mb} / G_{sbca})$

Where:

$VCA_{mix}$ = the voids in the coarse aggregate fraction of the mix. The coarse aggregate fraction of the aggregate is that portion of the JMF aggregate skeleton not passing the 4.75-millimeter sieve.

$P_{ca}$ = the percent of the coarse aggregate fraction by weight of total mix.

$G_{mb}$ = the bulk specific gravity of the mix at the design AC content as determined by Section 3.4.

$G_{sbca}$ = the bulk specific gravity of the coarse aggregate fraction as determined by AASHTO T 85.

1.4 For stone-on-stone contact $VCA_{mix}$ must be less than $VCA_{drc}$

**2. Surface Area Asphalt Content**

2.1 Determine "surface area" asphalt content according to Section 990, NJDOT B-10.

**3. Relative VMA Asphalt Content**

Note steps 3.1, 3.2 & 3.3 shall be done using a batch plant or mixing in the laboratory.

3.1 Heat aggregate to 25°F (14°C) above binder producer recommended compaction temperature. Heat molds to 50°F (28°C) above recommended compaction temperature. Heat binder to recommended mixing temperature.

3.2 Mix aggregate with asphalt and fiber at five asphalt contents (one at the estimated JMF asphalt content, one each at + and - 0.5% and one each at + and – 1.0% of the estimated JMF asphalt content). After mixing, return sample to the oven if necessary, and when at the recommended compaction temperature, compact the specimens. Three specimens will be compacted at each asphalt content using a Superpave Gyratory Compactor (50 gyrations).

3.3 When compacted, cool to room temperature before removing from mold.

3.4 Determine the bulk specific gravity, Gmb from each specimen's dry mass (grams) and volume in cubic centimeters. The volume is determined from the diameter of the plug and the height as determined from four equidistant measurements using a caliper accurate to 0.02 cm.

$G_{mb} = w / (\pi r^2 h / 0.99707)$

Where:

w = dry mass (measured to a tenth of gram)

$\pi$ = 3.1416

r = radius in cm (measure to 0.01" or 0.0254 CM)

h = height in cm as determined from 4 equidistant measurements.

0.99707 = density of water @ 25°C (77°F)

3.5 Determine maximum specific gravity, $G_{mm}$, of each specimen at each asphalt content according to AASHTO T 209.

3.6 From $G_{mb}$, $G_{mm}$, and each known asphalt content; calculate volumetric information as follows.

% AC by wt of Total mix = b

Volume of air = % air voids = $V_a = (1 – G_{mb} / G_{mm}) \times 100$

% by Volume of asphalt cement = $V_b = (b \times G_{mb})$

$$\text{Relative VMA} = V_a + V_b$$

Note: The volume of the fiber, absorbed asphalt, and Specific Gravity of asphalt binder are not accounted for in this procedure. This procedure measures "relative VMA".

3.7 Plot asphalt content versus "relative VMA" and select the asphalt content at the lowest point on the curve.

**4. Visual Draindown Asphalt Content**

4.1 Prepare 1000 gram samples of the uncompacted mix for each of the asphalt contents as detailed in Sections 3.1 and 3.2 above.

4.2 Place each sample into a clean, clear glass (Pyrex) 9 inch pie pans.

4.3 Place samples in oven for one hour at the binder manufacturer's recommended mixing temperature. Remove and let cool for one hour at room temperature.

4.4 Visually observe the amount of liquid asphalt on the bottom of each pan.

4.5 Select AC content where ample bonding is evident, without having excessive drainage as evidenced by an appearance of unconnected pools of asphalt binder around aggregate points of contact.

**5. Select Asphalt content for job mix formula (JMF)**

5.1 Determine the JMF asphalt content by averaging the results from the three methods (surface area, relative VMA, and draindown).

$$AC_{jmf} = (AC_{sc} + AC_{vma} + AC_{dd}) / 3$$

Where:

$AC_{jmf}$ = the design JMF

$AC_{sc}$ = the asphalt content determined by the surface area in Section 2 above.

$AC_{vma}$ = the asphalt content determined by relative VMA in Section 3 above.

$AC_{dd}$ = the asphalt content determined by draindown in Section 4 above.

**6. Verification of Abrasion and Impact Resistance of JMF**

6.1 Age at least two JMF specimens (plugs compacted with the same effort used during the design process) for 7 days ± 8 hours in an oven capable of maintaining 140 ± 5°F.

6.2 Utilizing a Los Angeles Machine conforming to AASHTO T 96, without the charge of steel balls, subject the aged samples of known weight (A) to 300 revolutions at 30 to 33 revolutions per minute. After the 300 revolutions reweigh the samples (B).

6.3 Calculate the Percent Loss

$$P_{loss} = 100 \times (A-B) / A$$

Where:

$P_{loss}$ = the loss expressed as percent of aged sample before L.A. Abrasion Machine treatment.

A = the weight of the samples before modified L.A. Abrasion test.

B = the weight of the samples after modified L.A. Abrasion test.

## B-12 TEST METHOD TO DETERMINE THE OPTIMUM ASPHALT CONTENT FOR OPEN GRADED FRICTION COURSE (OGFC).

**A. Scope.**

This test method is used to determine the optimum percentage of asphalt in a OGFC mixture. The test method uses a visual draindown analysis to determine optimum asphalt content.

**B. Apparatus.**

1. Ovens capable of maintaining temperatures as specified in this method.
2. Clear glass (Pyrex) 9" diameter pie pans.

**C. Procedure.**

1. Heat aggregate to 275°F. Heat molds to 275°F. Heat binder to recommended mixing temperature.
2. Using 1000 gram batches, mix aggregate with asphalt at a minimum of 3 asphalt contents (one at the estimated job mix formula (JMF) asphalt content and one each at + and - 0.5% of the estimated JMF asphalt content). After mixing, check the temperature to ensure that it is 250 ± 10°F. Cool or reheat as necessary to meet the temperature tolerance.
3. Place each 1000 gram batch into a clean, clear glass (Pyrex) 9 inch pie pans.
4. Place samples in an oven at 255 ± 5°F for one hour. Remove and let cool for one hour at room temperature.
5. Visually observe the amount of liquid asphalt on the bottom of each pan.
6. Select the asphalt content where ample bonding is evident, without having excessive drainage as evidenced by an appearance of unconnected pools of asphalt binder around aggregate points of contact.

**Test Method S-2**

**S-2 PROCEDURE FOR PERFORMING ROTATIONAL-CAPACITY TEST ON BOLTS TOO SHORT TO FIT TENSION CALIBRATOR.**

**B. Procedure.**

7.

THE LAST SIX PARAGRAPHS ARE REMOVED.

THE FOLLOWING IS ADDED:

**Test Method S-3**

**S-3 PROCEDURE FOR VERIFICATION AND INSTALLATION OF HIGH STRENGTH BOLTS WITH DIRECT TENSION INDICATORS (DTI's).**

**I. Verification of DTI Performance**

Verification of DTI performance is required prior to installation of bolts in the work. In bridge work the manufacturers are typically specifying smaller gaps in the spaces between the protrusions on the washer than normally used in other construction or in the gap specified for testing in the product specification ASTM F 959. The basic principle used in this verification test is to make sure that there is a DTI gap when the test tension is 1.05 times greater than the job installation tension requirement. The following verification procedure shall be used:

**A. Equipment Required:**

1. Calibrated bolt tension measuring device with a special flat insert in place of normal bolt head holding insert. Special insert required to allow access to measure DTI gap.

2. Tapered leaf thickness (feeler) gage 0.005 inch. Same gage as to be used to inspect the bolts after installation.

3. Bolts, nuts, and standard washers to be used in the work with the DTI's.

4. Impact and manual wrench to tighten bolts. Equipment should be the same as to be used in the work.

**B. Verification Test Procedure:** (Test three seats for each RC lot and position of DTI)

1. Install bolt, nut, DTI and standard washer into bolt tension measuring device. Assembly should match that to be used the work.

2. Use another wrench on the bolt head to prevent rotation of the head against the DTI if the DTI is to be used under the unturned element.

3. Tighten bolt to tension listed below (1.05 times the minimum installation tension). Use another wrench on the bolt head to prevent rotation of the head against the DTI if the DTI is to be used under the unturned element. If an impact wrench is used, tighten to a load slightly below the required load and use a manual wrench to

attain the required tension. The load indicating needle of the bolt calibrator cannot be read accurately when an impact wrench is used.

**[3]Bolt Tension, kips**

| **Bolt Size (inches)** | ½ | 5/8 | ¾ | 7/8 | **1** | **1 1/8** | **1 ¼** |
|---|---|---|---|---|---|---|---|
| M164 (A325) Bolts | 13 | 20 | 29 | 41 | 54 | 59 | 75 |

[3] Bolt Tension equals 1.05 (Min. Installation Tension)

4. Determine and record the number of spaces between the protrusion on the DTI that a 0.005 inch thickness gage is refused. The total number of spaces in the various sizes and grade of DTI's is shown below.

**Number of Spaces on DTI**

| **Bolt Diameter Inches** | ½ | **5/8** | ¾ | **7/8** | **1** | **1 1/8** | **1 ¼** |
|---|---|---|---|---|---|---|---|
| M164 (A325) Bolts | 4 | 4 | 5 | 5 | 6 | 6 | 7 |

5. The number of spaces which the 0.005 inch thickness gage is refused should not exceed the number given in the table below. If the number of spaces exceeds the number in the table, the DTI fails the verification test.

**Verification Criteria***

| **Number of spaces in washer** | **4** | **5** | **6** | **7** | **8** | **9** |
|---|---|---|---|---|---|---|
| Max. number of spaces gage is refused | 1 | 2 | 2 | 3 | 3 | 4 |

*b If the test is a coated DTI under the turned element, the maximum number of spaces that the gage is refused is the number of spaces on the washer minus one.

6. The bolts should be further tightened to the smallest gap to be allowed in the work. Normally, this smallest gap condition is achieved when the gaps at all the spaces are less than 0.005 inch (or a gap size as approved by the Engineer) and not all gaps completely closed. When such a condition is achieved, the 0.005 inch thickness gage is refused at all spaces but a visible gap exists in at least one space. Note the load in the bolt at the smallest gap. The bolts in this installation verification test and in the actual installation should not be tightened to a no visible gap condition when all the gaps are completely closed. The load in the bolt becomes indeterminate when no gap exists. It is possible to cause failure by tightening beyond complete crushing of the washer. The bolt load at this smallest gap should not cause excessive permanent inelastic deformation of the fastener. The degree of inelastic deformation is judged by removing the fastener from the test apparatus and turning the nut by hand the full length of the threads on the bolt after the test.

7. Remove the bolt from the calibrator and turn the nut on the threads of the bolt by hand. The nut should be able to be turned on the complete length of the threads, excluding the thread runout. Alternatively, if the nut is unable to go the full length, but the load at the minimum DTI gap (measured in step 6 above) is less than 95% of the bolt tension recorded at the nut rotation required for the rotational-capacity test, the assembly, including the DTI, is deemed to have passed the test. If the nut cannot be run the full thread length, and if the load at the smallest gap condition is greater that the 95% of the bolt tension recorded at the nut rotation

required for the rotational-capacity test, the load required for the smallest gap in step 6 is too large and the DTI lot shall be rejected.

**Short Bolts**

Bolts from Rotational Capacity (RC) lots too short to fit in the tension measuring device shall be tested in accordance with Test Method S-2 of these Specifications by tightening to the minimum DTI gap (measured in step 6 above) and checked in accordance with step 7. The 95% alternative cannot be used since short bolts are not tested in the tension measuring device for rotational capacity. The DTI used with the short bolt should be checked in accordance with step 1 through 5 using a longer bolt in the tension measuring device.

**II. Installation**

1. The use of a DTI under the unturned bolt head requires that the element bearing against the DTI not turn. Two men are required: One to operate the wrench, and the other to prevent turning of the element with the DTI and to monitor the gap. If the DTI is used under the turned element, an additional hardened washer must be used between the turning element and the protrusion on the DTI.

2. Snug the connection to compact the joint. The DTI should be inspected after snugging and the gaps checked. If the number of spaces in which the 0.005 inch thickness gage is refused exceeds the value in the table shown above in step 5 of the verification test, the bolt must be removed and another DTI installed. The bolt should be resnugged.

3. Tighten the bolts systematically to the inspection gap. The number of spaces in which the 0.005 inch thickness gage is refused should be equal or greater than the number shown in the table below. Tightening beyond the smallest gap established above in steps 6 and 7 is not allowed. Bolts which have a DTI with a smaller gap or no gap shall be replaced and the bolts tightened with a new DTI.

**Inspection Criteria ***

| **Number of spaces in washer** | **4** | **5** | **6** | **7** | **8** | **9** |
|---|---|---|---|---|---|---|
| Minimum spaces gage is refused | 2 | 3 | 3 | 4 | 4 | 5 |

* The gage shall be refused in all spaces when a coated DTI is used under the turned element.

# REQUIRED CONTRACT PROVISIONS
# FEDERAL-AID CONSTRUCTION CONTRACTS



## I. GENERAL

1. 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.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 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 DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attach-ment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

## II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

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 and 41 CFR 60) 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 Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American 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 State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his 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, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO 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 minority group employees.

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 minority groups 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 minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group 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, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group 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 his 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 investi-gation, the contractor will inform every complainant of all of his avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

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. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

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 minority group and women employees 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 his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. 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 best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best 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 SHA 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 minority and women 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 minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contrac-tor has

a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) 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 SHA.

8. **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.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **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 completion of the contract work and shall be available at reasonable times and places for inspection by authorized repre-sentatives of the SHA and the FHWA.

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

(1) The number 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;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA 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. If on-the job training is being required by special provision, the contractor will be required to collect and report training data.

**III. NONSEGREGATED FACILITIES**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

**IV. PAYMENT OF PREDETERMINED MINIMUM WAGE**

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. **General:**

a. All mechanics and laborers 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 (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) 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. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, 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 paragraphs 4 and 5 of this Section IV.

b. 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.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. **Classification:**

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification 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 DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour 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.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional 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. Said 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

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. **Payment of Fringe Benefits:**

a. 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 or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a 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.

4. **Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

a. Apprentices:

(1) 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 DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/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 Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees 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 employee 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 listed in 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 or subcontractor 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-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) 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 journeyman-level 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 for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an accept-able program is approved.

b. Trainees:

(1) 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 DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. 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.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level 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-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor 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. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. **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.

1. **Compliance with Copeland Regulations (29 CFR 3):**

6. **Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor 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, as 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 SHA contracting officer 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.

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her 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 dam-ages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies 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 8 above.

**V. STATEMENTS AND PAYROLLS**

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. **Payrolls and Payroll Records:**

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof 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. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found 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 and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

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

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such 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 the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. 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 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, 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 SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions 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.

**VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR**

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

**VII. SUBLETTING OR ASSIGNING THE CONTRACT**

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 State. 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).

a. "Its own organization" shall be construed to include only workers employed and paid directly 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, assignee, or agent of the prime contractor.

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 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 VII 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 SHA 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 SHA 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 SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

**VIII. SAFETY: ACCIDENT PREVENTION**

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 SHA 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. 333).

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. 333).

**IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

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, the following notice 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:

**NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS**

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 not more that $10,000 or imprisoned not more than 5 years or both."*

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

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

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

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environ-mental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such require-ments.

**XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

1. **Instructions for Certification - Primary Covered Transac-**

**tions:**

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary 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 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 primary 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 department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary 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," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary 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 primary 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 Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. 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.

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.

* * * * *

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions**

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement 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 embezzle-ment, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. 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 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary 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 Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

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," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

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.

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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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 Covered Transactions:**

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 participation in this transaction 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.

* * * * *

## XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(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 his or her bid or proposal that he or she 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.

**ATTACHMENT A - EMPLOYMENT PREFERENCE FOR APPALACHIAN CONTRACTS**

(Applicable to Appalachian contracts only.)

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph 1c shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph 4 below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which he estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, he shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within 1 week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph 1c above.

5. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

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

1. As used in these Specifications:

   a. Covered area means the geographical area in which the Project is located.

   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, US Treasury Department Form 941.

   d. Minority includes:

      (1) Black (a person having origins in any of the black African racial groups not of Hispanic origin);

      (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race);

      (3) Asian and Pacific Islander (a person having originals in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

      (4) American Indian or Alaskan Native (a person having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participating 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. The Contractor shall implement the specific affirmative action standards provided in paragraphs 6a through p 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. The

Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

4. 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 111246, or the regulations promulgated pursuant thereto.

5. 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 US Department of Labor.

6. 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 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 foreman, 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 individual 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 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 back to 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 women 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 source compiles under 6b 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 Foremen, 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 median, 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 females 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 subcontracts from minority and female construction Contraction 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.

7. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (6a 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 6A through p of these Specifications provided that the Contractor actively participates in the group, make every effort to assure that the group has a positive impact on the employment of minorities and females in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, make a good faith effort to meet its individual goals 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.

8. 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 nonminority. 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 underutilized).

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

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

11. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspensions, 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 Office 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.

12. 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 6 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.

13. 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 number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (such as 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.

14. 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 (such as those under the Public Works Employment Act of 1977 and the community Development Block Grant Program).

15. Noncompliance by the Contractor with the requirements of the Affirmative Action Program for Equal Employment Opportunity may be cause for delaying or withholding monthly and final payments pending corrective and appropriate measures by the Contractor to the satisfaction of the Department.

December 1980
Rev. April 1984

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

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

   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 nonfederally involved construction.

   The Contractor's compliance with the Executive Order and the regulations in 41 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 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.

2. The Contractor will provide the Department with written notification in triplicate 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 will 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 contract is to be performed.

3. As used in this Notice and in the Contract resulting from this solicitation the covered area is the county or counties in which the Project is located.

4. If a project is located in more than one county, the minority work hours goal, only, will be determined by the county which serves as the primary source of hiring or, if workers are obtained almost equally from one or more counties, the single minority goal will be the average of the affected county goals.

# WORK HOUR GOALS IN EACH TRADE FOR MINORITY AND FEMALE PARTICIPATION

| COUNTY | MINORITY PARTICIPATION PERCENT | FEMALE PARTICIPATION PERCENT |
|---|---|---|
| Atlantic | 18.2 | 6.9 |
| Bergen | 15.0 | 6.9 |
| Burlington | 17.3 | 6.9 |
| Camden | 17.3 | 6.9 |
| Cape May | 14.5 | 6.9 |
| Cumberland | 16.0 | 6.9 |
| Essex | 17.3 | 6.9 |
| Gloucester | 17.3 | 6.9 |
| Hudson | 12.8 | 6.9 |
| Hunterdon | 17.0 | 6.9 |
| Mercer | 16.4 | 6.9 |
| Middlesex | 15.0 | 6.9 |
| Monmouth | 9.5 | 6.9 |
| Morris | 17.3 | 6.9 |
| Ocean | 17.0 | 6.9 |
| Passaic | 12.9 | 6.9 |
| Salem | 12.3 | 6.9 |
| Somerset | 17.3 | 6.9 |
| Sussex | 17.0 | 6.9 |
| Union | 17.3 | 6.9 |
| Warren | 1.6 | 6.9 |

November 1978
Rev. April 1984

# STATE OF NEW JERSEY EQUAL EMPLOYMENT OPPORTUNITY FOR CONTRACTS FUNDED BY FHWA

The parties to this Agreement do hereby agree that the provisions of NJSA 10:2-1 through 10:2-4 and NJSA 10:5-31 et seq (PL 1975, c 127, as amended and supplemented) dealing with discrimination in employment on public contracts, and the rules and regulations promulgated pursuant thereunto, are hereby made a part of this contract and are binding upon them.

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

a. The Contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status or sex. The Contractor will take affirmative action to ensure that such applicants are recruited and employed, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status or sex. 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 Department Compliance Officer setting forth provisions of this nondiscrimination clause;

b. The Contractor or subcontractor, where applicable 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 age, race, creed, color, national origin, ancestry, marital status or sex;

c. The Contractor of subcontractor, where applicable, will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Department of Compliance Officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The notices referred to in paragraphs a and c may be obtained from the Supervising Engineer of Construction or his representative at the preconstruction conference.

# EMERGING SMALL BUSINESS ENTERPRISE UTILIZATION ATTACHMENT

## FHWA FUNDED CONTRACTS

## I. UTILIZATION OF EMERGING SMALL BUSINESS ENTERPRISE (ESBE) AS CONTRACTORS, MATERIALS SUPPLIERS AND EQUIPMENT LESSORS.

The New Jersey Department of Transportation (NJDOT) advises each contractor or subcontractor that failure to carry out the requirements set forth in this attachment shall constitute a breach of contract and, after the notification of the applicable federal agency, may result in termination of the agreement or contract by the Department or such remedy as the Department deems appropriate. Requirements set forth in this section shall also be physically included in all subcontracts in accordance with USDOT requirements.

## II. POLICY.

It is the policy of the NJDOT that Emerging Small Business Enterprises (ESBE), as defined in Section IV, Part B below, shall have an opportunity to participate in the performance of contracts financed in whole or in part with federal funds. In furtherance of this policy the NJDOT has established an Emerging Small Business Enterprise Program. This program is designed to promote participation and shared economic opportunity by smaller firms who qualify as ESBE's in NJDOT construction contracts and is undertaken pursuant to the authority contained in 23 CFR Part 26.

## III. CONTRACTOR'S ESBE OBLIGATION.

The contractor agrees to ensure that ESBE's, as defined in Section IV, Part B below, have an equal opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds. In performing work under this agreement with the NJDOT, the contractor shall take all necessary and reasonable steps in accordance with the provisions of this attachment to ensure that ESBE's have the maximum opportunity to compete for and perform contracts. The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of any contract obligation including, but not limited to, its performance of its obligations under this ESBE attachment.

## IV. GOALS FOR THIS PROJECT.

A. This project includes a goal of awarding _8_ percent of the total contract value to subcontractors, equipment lessors and/or material suppliers, which qualify as ESBE's.

1. Failure to meet the minimum goal placed on this project, or to provide a good faith effort to meet the minimum goal, may be grounds for rejection of the bid as being non-responsive.

2. As a source of information only, an ESBE Directory is available from the Division of Civil Rights/Affirmative Action. Use of this listing does not relieve the contractor of its responsibility to seek out ESBE's not listed, prior to bid. If a contractor proposes to use an ESBE contractor not listed in the ESBE Directory, the proposed ESBE firm must submit a completed certification application to the Division of Civil Rights/Affirmative Action, fifteen (15) days prior to bid date.

B. DEFINITIONS.

1. Emerging Small Business Enterprise is defined as: a for-profit business concern classified as a small business pursuant to the appropriate Small Business Administration regulations, and which is owned and controlled by individuals who do not exceed the personal net worth criteria ($750,000) established in 49 CFR Part 26.

2. Owned and Controlled is defined as: that at least 51% of the ownership interests as well as the management and daily business operations of the firm reside in individuals whose personal net worth does not exceed the requirements established in 49 CFR, Part 26.

V. COUNTING ESBE PARTICIPATION.

A. Each ESBE is subject to a certification procedure to ensure its ESBE eligibility status prior to the award of contract. In order to facilitate this process it is advisable for the bidder to furnish names of proposed ESBE's to the Department 15 days before bid opening. Once a firm is determined to be a bona fide ESBE by the Division of Civil Rights/Affirmative Action, the total dollar value of the contract awarded to the ESBE is counted toward the applicable goal.

B. The contractor may count toward its ESBE goal only expenditures to ESBE's that perform a commercially useful function in the work of a contract. An ESBE is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibility by actually performing, managing and supervising the work involved. To determine whether an ESBE is performing a commercially useful function, the contractor shall evaluate the amount of work contracted, industry practice and other relevant factors.

C. If a ESBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the ESBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, you must presume that it is not performing a commercially useful function.

D. If the prime contractor is a certified ESBE, payments made to the contractor for work performed by the contractor will be applied toward the ESBE goal. Payments made to the prime contractor for work performed by non-ESBE's will not be applied toward the ESBE goal.

E. The prime contractor may count 60 percent of its expenditures to ESBE suppliers that are not manufacturers, provided that the ESBE supplier performs a commercially useful function in the supply process. The contractor may count 100% of its expenditure to ESBE suppliers who are also manufacturers. Manufacturers receive 100% credit toward the ESBE goal.

VI. GOOD FAITH EFFORT.

To demonstrate sufficient reasonable efforts to meet the ESBE contract goals, a bidder shall document the steps it has taken to obtain ESBE participation, including but not limited to the following:

A. Attendance at a pre-bid meeting, if any, scheduled by the Department to inform ESBE's of prime contracting and subcontracting opportunities under a given solicitation.

B. Advertisement in general circulation media, trade association publications, and small business publications for at least 20 days before bids are due. If 20 days are not available, publication for a shorter reasonable time is acceptable.

C. Written notification to ESBE's that their interest in the contract is solicited;

D. Efforts made to select portions of the work proposed to be performed by ESBE's in order to increase the likelihood of achieving the stated goal;

E. Efforts made to negotiate with ESBE's for specific bids including at a minimum:

1. The names, addresses and telephone numbers of ESBE's that were contacted;

2. A description of the information provided to ESBE's regarding the plans and specifications for the work to be performed; and

3. A statement of why additional agreements with ESBE's were not reached;

F. Information regarding each ESBE the bidder contacted and rejected as unqualified and the reasons for the bidder's conclusion;

G. Efforts made to assist the ESBE in obtaining bonding or insurance required by the bidder or the department.

NOTE: If the Division of Civil Rights/Affirmative Action determines that the apparent successful low bidder has failed to meet the requirements of this section, the bidder will be afforded the opportunity for an administrative reconsideration of that determination prior to the award or rejection of the contract. As part of the administrative reconsideration process, 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. NJDOT will send the bidder a written decision on reconsideration, 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 result of the reconsideration process is not administratively appealable to the USDOT.

VII. SUBMISSION OF REQUIRED DOCUMENTS.

A. The following shall be submitted either with the bid or to the Division of Civil Rights and Affirmative Action no later than seven (7) State business days after the date of receipt of bids.

1. ESBE Form "A2" - Schedule of ESBE Participation. List all ESBE's participating in the contract; listing the scope of work, dollar value and percent of total contract to be performed.

2. Supplement to ESBE Form "A2"- A list of all subcontractors who submitted bids or quotes on this project.

3. ESBE Form B - Affidavit of Emerging Small Business Enterprise. Each proposed ESBE not listed in the NJDOT ESBE directory must submit Form B attesting to its validity as an ESBE. (All firms must be certified by the Department's ESBE Coordinator prior to award of the contract).

4. Request for Exemption - In the event that the bidder fails to meet the specified goal, they must submit within Seven State business days of the bid, a written request for exemption to the goal. This request must include a written statement addressing Items A through G in Article VI of this attachment in addition to an accounting of the reason(s) why each items in the bid proposal was not subcontracted. Submittal of such request does not imply departmental approval. An assessment of the material will be conducted by the Department's Division of Civil Rights/Affirmative Action.

5. The name of the person who is serving as its ESBE Liaison Officer

B. The State Highway Engineer will be the sole judge of proper compliance and action taken in fulfilling the requirements as set forth herein.

VIII. ESBE LIAISON OFFICER.

A. The contractor shall designate an ESBE Liaison Officer who shall be responsible for the administration if its ESBE program in accordance with the requirements of this attachment.

IX. OBLIGATIONS AFTER AWARD OF THE CONTRACT.

If at any time following the award of contract, the contractor intends to sublet any portion(s) of the work under said contract, or intends to purchase material or lease equipment not contemplated during preparation of bids, said contractor shall take the following actions:

1. Notify the Resident Engineer, in writing, of the type and approximate value of the work the contractor intends to accomplish by such subcontract, purchase order or lease.

2. Attempt to obtain a qualified ESBE to perform the work.

3. Submit the Post-Award ESBE Certification Form to the Regional Supervising Engineer with his application to sublet or prior to purchasing material or leasing equipment. Post Award ESBE forms may be obtained from the Resident Engineer.

X. CONSENT BY DEPARTMENT TO SUBLETTING.

The Department will not approve any subcontract proposed by the Contractor unless and until said contractor has complied with the terms of this attachment.

XI. SELECTION AND RETENTION OF SUBCONTRACTORS.

A. The contractor is further obligated to provide the Resident Engineer with a listing of firms, organizations or enterprises solicited and those utilized as subcontractors on the proposed project. Such listing shall clearly delineate which firms are classified as an ESBE.

B. The contractor shall identify all efforts it made to identify and retain an ESBE as a substitution subcontractor when the arrangements with the original ESBE proved unsuccessful shall be submitted in writing to the Department's ESBE Coordinator for approval. Work in the category concerned shall not begin until such approval is granted in writing.

C. Notification of a subcontractor's termination will be sent to the Department by the contractor through the Resident Engineer. Said termination notice will state whether the subcontractor is an ESBE and the reason for termination.

XII. CONCILIATION.

Allegations of breach of any obligation contained in these ESBE provisions will be investigated by the Federal Office of Contract Compliance in conjunction with the Division of Civil Rights/Affirmative Action of the New Jersey Department of Transportation and the Federal Highway Administration.

XIII. DOCUMENTATION.

A. The Department or the federal funding agencies may at any time require such information as is deemed necessary in the judgement of the Department to ascertain the compliance of any bidder or contractor with the terms of these provisions.

B. Record and Reports.

The Contractor shall keep such records as are necessary to determine compliance with its Emerging Small Business Enterprise Utilization obligations. The records kept by the contractor will be designed to indicate:

1. The names of ESBE contractors, equipment lessors and material suppliers contacted for work on this project.

2. Work, services and materials which are not performed or supplied by the prime contractor.

3. The actual dollar value of work subcontracted and awarded to ESBE's.

4. Efforts taken in seeking out and utilizing ESBE's. This would include solicitations, quotes and bids regarding project work items, supplies, leases, or other contract items.

5. Documentation of all correspondence, contacts, telephone calls, or other actions taken to obtain the services of ESBE's on this project.

6. Records of all ESBE's who have submitted quotes/bids to the contractor on the project.

C. Submit reports, as required by the Department, on those contracts and other business transactions executed with ESBE's in such form and manner as may be prescribed by the Department.

D. All such records must be maintained for a period of three (3) years following acceptance of final payment and will be available for inspection by the Department.

XIV. PAYMENT TO SUBCONTRACTORS.

The Contractor agrees to pay its subcontractors in accordance with Subsections 109.05 and 109.07 of the 1996 Standard Specifications, as amended.

XV. NON-COMPLIANCE.

Failure by the bidder to comply with these provisions may result in rejection of the bid. The contractor may further be declared ineligible for future Department contracts.

# EQUAL EMPLOYMENT OPPORTUNITY SPECIAL PROVISIONS

1. General

   a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract Provisions (Form FHWA-1273) and these Special Provisions which are imposed pursuant to Section 140 of Title 23 USC, as established by Section 22 of the Federal Aid Highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the Equal Employment Opportunity requirements set forth in the Required Contract Provisions.

   b. The Contractor will work with the State agencies and the Federal Government in carrying out Equal Employment Opportunity obligations and in their review of activities under the contract.

   c. The Contractor and all subcontractors holding subcontracts, not including material suppliers, of $10,000 or more, will comply with the following minimum specific requirement activities of Equal Employment Opportunity. The Contractor will include these requirements in every subcontract of $10,000 or more with such modification of language as is necessary to make them binding on the subcontractor. (The equal employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors).

   d. Noncompliance by the Contractor with the requirements of the Affirmative Action Program for Equal Employment Opportunity may be cause for delaying or withholding monthly and final payments pending corrective and appropriate measures by the Contractor to the satisfaction of the Department.

2. Equal Employment Opportunity Policy

   The Contractor will accept as its operating policy the following statement which is designed to further the provisions of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a positive continuing program:

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, or national origin. 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, preapprenticeship, and on-the-job training.

3. Equal Employment Opportunity Officer

The Contractor will designate and make known to the Department contracting officers an equal opportunity officer (hereinafter referred to as the EEO Officer) who will have the capability, authority and responsibility to effectively implement and promote an active contractor program of equal employment opportunity.

4. Dissemination of Policy

a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommended such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure compliance, the following minimum actions will be taken:

(1) An initial project site meeting with key supervisory and office personnel will be conducted before or at the start of work, and then not less than once every 6 months, at which time the Contractor's equal employment opportunity program will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

(2) All new supervisory and office personnel will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official covering all major aspects of the Contractor's equal employment opportunity obligations within 30 days following their reporting for duty with the Contractor.

(3) All personnel engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official concerning the Contractor's procedures for locating and hiring minority and female employees.

b. In order to make the Contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor will take the following actions:

(1) Notices and posters setting forth the Contractor's equal employment

opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

(2) The Contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, and/or other appropriate means.

5. Recruitment

a. When advertising for employees, the Contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

b. 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 minority and female applicants, including, but not limited to, State employment agencies, schools, colleges and minority-oriented organizations. To meet this requirement, the Contractor will, through his EEO Officer, identify sources of potential minority and female employees, and establish procedures with such sources whereby applicants may be referred to the Contractor for employment consideration.

In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with the equal employment opportunity contract provisions. (The US Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or females, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended).

c. The Contractor will encourage his present employees to refer minority and female applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures pertaining to the referral of applicants will be discussed with employees.

6. 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, or national origin. The following procedures shall be followed:

a. The Contractor will conduct a project site inspection at the start of work, and periodically thereafter, to ensure 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, and will resolve or attempt to resolve such complaints, within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, corrective action shall include such other persons. Upon completion of each investigation, the Contractor will inform complainants of available avenues of appeal.

7. Training Special Provisions

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 journeypeople in the type of craft or job classification involved.

The number of training positions will be 26 , where feasible consisting of at least 10 apprentices and 16 apprentice graduates of the Pre-Apprenticeship Training Cooperative Program, sponsored by the signatories of the October 26, 1994 Memorandum of Understanding, and/or trainees.

Apprentices are defined as registered members of an approved apprenticeship program recognized by the United States Department of Labor (USDOL) Bureau of Apprenticeship and Training (BAT) or a New Jersey State apprenticeship agency recognized by USDOL BAT (e.g., New Jersey Department of Education). Graduates of the Pre-Apprenticeship Training Cooperative Program shall be classified as apprentices. Trainees are defined as skilled, semi-skilled or lower level management individuals receiving training per one of the approved NJDOT "Revised Standard Training Guidelines" (available from the Division of Civil Rights).

Where feasible, at least 50% of the training positions will be assigned to Skilled Crafts which include but are not limited to Carpenters, Dockbuilders, Electricians, Ironworkers and Operating Engineers.

a. Contractor Submission and NJDOT Approval of the Initial Training Program.

At or after the preconstruction conference and prior to the start of work, the Contractor shall submit a training program to the Resident Engineer for his or her review and comments prior to Division of Civil Rights review and approval. The Contractor's training program shall include:

(1) the number of trainees or apprentices to be trained in all selected Training Positions,
(2) the Standard Program Hours for all positions,
(3) an estimate of the Minimum Available Hours actually feasible on the project toward completion of the Standard Program Hours per position,
(4) a training schedule of Estimated Start Dates for the apprentices or trainees, developed and coordinated with the project's work progress schedule,
(5) Training Guidelines for all positions, and
(6) which training will be provided by the Contractor and which by Subcontractors.

The number of apprentices and trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeypeople in the various crafts within a reasonable area of recruitment. The Contractor shall submit timely, revised training programs as required throughout the project to ensure that feasible and Maximum Available Training is provided. Maximum Available Training is defined as bringing each apprentice or trainee onto the project when work first becomes available in his/her craft and providing all available training until hours are no longer available.

b. Assignment of Training to Subcontractors

In the event that portions of the contract work are subcontracted, the Contractor shall determine how many, if any, of the apprentices or trainees are to be trained by subcontractors, provided, however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by these Training Special Provisions. The Contractor shall also ensure that these Training Special Provisions are made applicable to such subcontracts.

c. Requirements for Recruitment, Selection and Approval of Apprentices and Trainees

(1) Apprentices or trainees should be in their first year of apprenticeship or training. The Contractor shall interview and screen trainee candidates to determine if their actual work experience is equivalent to or exceeds that offered by the training program prior to submitting candidates, via the Resident Engineer, to the Division for review and approval or disapproval.

(2) Training and upgrading of minorities (e.g., Blacks, Asians or Pacific Islanders, Native Americans or Alaskan Natives, Hispanics) and females toward journeyperson status is a primary objective of these Training Special Provisions. Accordingly, the Contractor shall make every effort to enroll minorities and females, by conducting systematic and direct recruitment through public and private sources likely to yield minority and female apprentices or trainees, to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

(3) No employee shall be employed as an apprentice or trainee in any position in which he or she has successfully completed a training course leading to journeyperson status or in which he or she has been employed as a journeyperson. The Contractor shall satisfy this requirement by including appropriate questions in the employment application or by other suitable means and by submitting an accurate and complete "Apprentice/Trainee Approval Memorandum." Regardless of the methods used, the Contractor's records should document the findings in each case.

(4) Skilled craft trainees may complete up to 3,000 total training hours on NJDOT projects, with an extension of an additional 1,000 hours permitted on a case-by-case basis. Semi-skilled and lower-level management trainees attain journeyperson status upon completion of a training guideline and may complete up to three (3) different positions.

d. Apprenticeship and Training Programs

(1) The minimum length and type of training for each position will be established in the training program selected by the Contractor and approved by NJDOT and the Federal Highway Administration. NJDOT will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average apprentice or trainee for journeyperson status in the craft concerned by the end of the training period.

(2) Apprenticeship programs registered with the US Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by USDOL BAT and training programs approved but not necessarily sponsored by the US Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training shall

also be considered acceptable provided such programs are 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 NJDOT Division of Civil Rights prior to commencing work on the positions covered by the Contractor's training program. The Division will review guidelines developed by the Contractor for approval or disapproval in accordance with the Training Guideline Approval Process described in the "Revised Standard Training Guidelines". The Division will also review existing guidelines for revision based on the same process.

(3) It is the intention of these provisions that training be provided in construction crafts rather than clerk-typist or secretarial-type positions. Training is permitted in lower level management positions (e.g., timekeepers), where the training is oriented toward project site applications. Training in semi-skilled laborer positions is permitted provided that significant and meaningful training is available on the project site. Some offsite, classroom training (e.g., safety, first aid instruction) may be permitted as long as such training is an integral part of an approved training program and does not comprise a significant part of the overall training.

e. Reimbursement of the Contractor for Providing Training

(1) The Contractor will be credited for each apprentice or trainee employed on the construction site who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such apprentices or trainees as provided hereinafter. Payment will be made under the pay item Trainees at the bid price in the Proposal per person-hour of training given an employee on this contract in accordance with an approved training program. If approved, payment 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 do not specifically prohibit the Contractor from receiving other reimbursement. Offsite, classroom training reimbursement may only be made to the Contractor when the company does one or more of the following and the apprentices or trainees are concurrently employed on a Federal-aid project: contributes to the cost of the training and/or provides instruction to apprentices or trainees or pays their wages during the offsite, classroom training (e.g., safety, first aid instruction) period.

(2) The Contractor shall pay apprentices and trainees according to the project-specific New Jersey Department of Labor Prevailing Wage Rate Determination for the project.

f. Documentation Required to be Signed by Apprentices or Trainees and provided to NJDOT

(1) At the start of training, the Contractor shall provide the Resident Engineer and each apprentice or trainee with an applicable "Training Guideline" and, at the conclusion of training, an accurate and complete "Training Certificate for Reporting Hours to NJDOT", showing hours of training satisfactorily completed.

(2) The Contractor shall maintain and submit an accurate and complete "NJDOT Contractor's 1409 Quarterly Training Report" to the Resident Engineer within ten (10) days of the end of each training quarter (e.g., January 10, April 10, July 10, October 10); a copy shall also be given to each apprentice or trainee.

(3) The Contractor shall maintain and submit accurate and complete "Biweekly Training Reports" to the Resident Engineer, and each apprentice or trainee, as periodic reports documenting performance under these Training Special Provisions.

g. Training and Promotion

(1) The Contractor shall assist in locating, qualifying, and increasing the skills of minority and female employees, and applicants for employment.

(2) The Contractor shall advise employees and applicants for employment of available training programs and entrance requirements.

(3) The Contractor shall periodically review the training and promotion potential of minority and female employees and encourage eligible employees to apply for such training and promotion.

h. Determining Good Faith Compliance

(1) Per the approved program or guideline, the Contractor shall provide Maximum Available Training to apprentices and trainees by beginning their training as soon as feasible with the start of craft work utilizing the skill involved on the project construction site and by retaining them as long as training opportunities exist in their crafts or until their training program positions are completed.

(2) The Contractor shall recall apprentices or trainees released due to reductions in force when the work scope permits and they are available to

return. When they are unavailable to resume training on the project site, the Contractor shall submit written proof of recall efforts and replacement candidates and/or positions in a timely manner. The Contractor shall not terminate apprentices or trainees prior to completion of their training program positions without NJDOT consultation and authorization. Apprentices or trainees are not required to be on board for the entire length of the contract.

(3) The Contractor shall have fulfilled the contractual responsibilities under these Training Special Provisions if the company has provided Acceptable Training to the number of apprentices or trainees specified in this contract and/or by providing the remaining hours required to complete training positions begun by apprentices or trainees on other projects. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

(4) The Contractor shall be responsible for demonstrating all steps that have been taken in pursuance of enrolling minorities and females in the training program positions, prior to a determination as to whether the Contractor is in compliance with these Training Special Provisions.

(5) The Contractor shall submit to the Resident Engineer written training program summaries at the 50% time and/or cost stage of the contract and also prior to project completion, describing all good faith actions and particularly addressing Maximum Available Training for incomplete training positions, per the procedure found in the revised "Instructions for Implementing the Training Special Provisions".

i. Enforcement Measures and Contractor's Rating

(1) Payment will not be made if either the failure to provide the required training or the failure to hire the apprentice or trainee as a journeyperson is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of these Training Special Provisions.

(2) Per established procedures and scheduled Contract Compliance Reviews, the Contractor's performance will be rated and reviewed periodically by the Department.

(3) Noncompliance with these Training Special Provisions may be cause for delaying or withholding monthly and final payments, pending corrective and appropriate measures by the Contractor to the satisfaction of the Department, per Item 1d of these EEO Special Provisions.

8. Unions

If the Contractor relies in whole or in part upon unions as a source of employees, the

Contractor will make maximum effort to obtain the cooperation of such unions to increase opportunities for minorities and females within the unions, and to effect such union referrals to the construction project. 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 maximum effort to develop, in cooperation with the unions, joint training programs aimed at qualifying more minorities and females for union membership and increasing their skills in order to qualify for higher paying employment.

b. The Contractor will use maximum effort to incorporate an equal employment opportunity 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, or national origin.

c. The Contractor will obtain information concerning the referral practices and policies of the labor unions except that to the extent such information is within the exclusive possession of the labor unions and they refuse to furnish this information to the Contractor, the Contractor shall so certify to the Department and shall set forth what efforts have been made to obtain this information.

d. In the event the unions are unable to provide the Contractor with a reasonable flow of minority and female 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, or national origin, making full efforts to obtain qualified and/or qualifiable minorities and females. (The US Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees). 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 Department.

9. Subcontracting

a. The Contractor will use maximum effort to solicit bids from and to utilize minority subcontractors or subcontractors with meaningful minority and female representation among their employees. Contractors may use lists of minority-owned construction firms as issued by the Department.

b. The Contractor will use maximum effort to ensure subcontractor compliance with the equal employment opportunity obligations.

10. Documents and Reports

a. The Contractor will maintain such documents as are necessary to determine

compliance with the contract's equal employment opportunity requirements. Documents will include the following:

(1) the number of minorities, non-minorities, and females employed in each work classification on the Project.

(2) the progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and females (applicable only to Contractors who rely in whole or in part on unions as a source of their work force).

(3) the progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and

(4) the progress and efforts being made in securing the services of minority and female subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. All such documents must be retained for a period of 3 years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the Department and the Federal Highway Administration.

c. The Contractor and each subcontractor will complete and submit monthly, except July, to the Department Form T-AD-1276 Monthly Project Manning Report. The FHWA-1391 July report is of special interest to the Department and FHWA; therefore it must be submitted to the Resident Engineer not later than 5 calendar days following the end of July. Payments due the Contractor will be reduced by $100 per day for each day after August 5 that the 1391 Form has not been submitted.

# SPECIAL CONTRACT PROVISIONS FOR INVESTIGATING, REPORTING AND RESOLVING EMPLOYMENT DISCRIMINATION AND SEXUAL HARASSMENT COMPLAINTS

The contractor hereby agrees to the following requirements in order to implement fully the nondiscrimination provisions of the Supplemental Specifications.

The Contractor agrees that in instances when it receives from any person working on the project site a verbal or written complaint of employment discrimination, prohibited under N.J.S.A. 10:5-1 et seq., 10:2-1 et seq., 42 U.S.C. 2000(d) et seq., 42 U.S.C. 2000 (e) et seq. and Executive Order 11246, it shall take the following actions:

1. Within one (1) working day commence an investigation of the complaint which shall include but not be limited to interviewing the complainant, the respondent, and all possible witnesses to the alleged act or acts of discrimination or sexual harassment.

2. Prepare and keep for its use and file a detailed written investigative report which includes the following information:

   a) Investigatory activities and findings.

   b) Dates and parties involved and activities involved in resolving the complaint.

   c) Resolution and corrective action taken if discrimination or sexual harassment is found to have taken place.

   d) A signed copy of resolution of complaint by complainant and contractor.

   In addition to keeping in its files the above-noted detailed written investigative report, the contractor shall keep for possible future review by the Department all other records, including but not limited to, interview memos and statements.

3. Upon the request of the Department, provides to the Department within ten (10) calendar days a copy of its detailed written investigative report and all other records on the complaint investigation and resolution.

4. Take appropriate disciplinary action against any contractor employee, official or agent who has committed acts of discrimination or sexual harassment against any contractor employee or person working on the project. If the person committing the discrimination is a subcontractor employee, then the contractor is required to attempt to effectuate corrective and/or disciplinary action by the subcontractor in order to establish compliance with project's contract requirements.

5. Take appropriate disciplinary action against any contractor employee, official or agent who

retaliates, coerces or intimidates any complaint and/or person who provides information or assistance to any investigation of complaints of discrimination or sexual harassment. If the person retaliating, coercing or intimidating a complainant or other person assisting an investigation is a subcontractor's employee, then the contractor is required to attempt to effectuate corrective and/or disciplinary action by the subcontractor in order to establish compliance with the project's contract requirements.

6. Ensure toe the maximum extent possible that the privacy interests of all person who give confidential information in aid of the contractor's employment discrimination investigation are protected.

In conjunction with the above requirements, the contractor shall develop and post a written sexual harassment policy for its work force.

Failure by the contractor to comply with the above requirements may be cause for the New Jersey Department of Transportation to institute against the contractor any and all enoforcement proceedings and/or sanctions authorized by the contract or by state and/or federal law.