

SPECIAL PROVISIONS

ALEXANDER ROAD OVER AMTRAK'S NORTHEAST CORRIDOR
FROM VICINITY OF OLD BEAR BROOK ROAD TO WALLACE ROAD AND
NORTH POST ROAD FROM WOODMEADOW LANE TO ALEXANDER ROAD
CONTRACT NO. MER994140
BRIDGE REPLACEMENT AND INTERSECTION IMPROVEMENTS

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 ____ inclusive for General, Road, and Bridge Provisions.

Disadvantaged Business Enterprise Utilization Attachment, FHWA Funded Contracts, pages 1 to 7 inclusive, dated September 1987, revised January 1989, September 1992, and May 1995.

Incentive Program, Disadvantaged Business Enterprise Utilization Attachment for FHWA Funded Contracts, pages 1 and 2, dated April 6, 1993.

State of New Jersey Equal Employment Opportunity for Contracts Funded by Wholly State Funds, pages 1 to 4 inclusive, dated April 2003.

Payroll Requirements for 100 Percent State Projects, dated December 1986, revised September, 1992.

Americans with Disabilities Act for 100 Percent State Funded Contracts, page 1, dated August 1993.

Equal Employment Opportunity Special Provisions Construction Contracts Funded by Wholly State Funds, pages 1 to 10 inclusive, dated April 2003.

Small Business Enterprise Utilization Attachment for 100% State Funded Contracts, pages 1 to 6 inclusive, dated March 2004.

Minority/Female Outreach and Training Program for Wholly State Funded Projects attachment, dated September 7, 1999.

The Contractor shall pay the minimum wage rates determined by the New Jersey Department of Labor.

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.

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 CHANGED:

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.

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 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.

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.

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.

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.

THE FOLLOWING TERM IS CHANGED TO:

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.

THE FOLLOWING TERMS ARE DELETED:

CLAIMS REVIEW BOARD

DISPUTE

101.04 Inquiries Regarding the Project.

THE FOLLOWING IS ADDED:

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

102.01 Prequalification of Prospective Bidders.

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

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 FOLLOWING IS ADDED TO THE END OF LIST:

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.

102.06 Examination of Contract Documents and Site of Project.

THE ENTIRE SUBSECTION IS CHANGED TO:

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.

THE FOLLOWING IS ADDED:

- 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 in the Special Provisions.

- a.
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.

102.10 Proposal Bond.

THE FIRST PARAGRAPH IS CHANGED TO:

The Proposal, when submitted, shall be accompanied by a proposal bond satisfactory to the Commissioner, on the form furnished by the Department, for a sum of 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 shall not be accepted.

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 Commissioner 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.

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 Arch Structures

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:

Water

Michael Wolan
Project Manager
New Jersey American Water
120 Raider Boulevard
P.O. Box 1207
Belle Mead, NJ 08502

Sewer

George Spille
Director, Public Works Department
Township of West Windsor
P.O. Box 38
Princeton Junction, NJ 08550

Electric

Jay Pennell
Senior Engineering Technician
PSE&G – Electric
300 New Albany Road
Moorestown, NJ 08057
Tel: (856) 778-6814

Telephone

Tom Young
Design Engineer
Verizon – Telephone
1490 Prospect Street
Trenton, NJ 08638

Telephone

Emmet Flynn
Construction Manager
Worldcom (MCI)
630 Clarke Avenue
King of Prussia, PA 19406

Telephone

Louis Marelo
Outside Plant Engineer
AT&T
50 Patricia Drive
Flanders, NJ 07836

Fiber Optic Telephone

David Vega
Construction Manager – NNS
6800 Jericho Turnpike Suite 107W
Syosset, NY 11791

Cable

Andy Cortes
Comcast Cable
751 Brick Blvd.
Brick, NJ 08723

Gas

William Montague
PSE&G – Gas
80 Park Plaza
Mail Code: T13
Newark, NJ 07101

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 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. A 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 project 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 plan 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 plan are approximate (plus or minus).
9. Utility shall obtain the railroad permit/easement for aerial crossing or pole placement within Amtrak right of way.

Public Service Electric and Gas – Electric**Existing Facilities****Alexander Road**

1100 ft. $\pm$ 13 KV primary & 26 KV wire
11 joint poles with telephone and cable

North Post Road

1500 ft. of 13 KV primary & 800 ft. 26 KV wire

Old Bear Brook Road

150 ft. $\pm$ 13 KV primary wire
2 poles

Work To Be Performed By Public Service Electric and Gas

1. Alexander Road Sta. 10 $\pm$ 50 Rt. (UP #2092WW) to 21 $\pm$ 08 Lt. (UP #PS1608WW).
Construct 10 temporary poles from Sta. 11 $\pm$ 33, 25' Lt. To 20 $\pm$ 55, 65' Lt.
Construct 1160' of 2-13 KV and 1-26 KV primary circuits.
Remove existing aerial facilities.
2. Construct 14 permanent poles from Sta. 11 $\pm$ 70, 21' Lt. to Sta. 20 $\pm$ 60, 55' Lt.
Construct 1671' of 2-13 KV primary circuits
Remove temporary aerial facilities.

3. North Post Road Sta. 15 ± 00 Rt. (UP #A62645WW) to Sta. 30 ± 00 Lt. (UP #60723WW).
Construct 4 poles at sta. 22 ± 06, 46' Rt., Sta. 23 ± 21, 40' Rt., Sta. 27 ± 41, 62' Rt. to Sta. 28 ± 00, 30' Lt.
Construct 1500' of 2-13 KV primary circuits.

4. Old Bear Brook Road
Relocate 1 Pole (60623WW) and construct 150' of 13 KV primary wire.

5. Construct lighting arms with cobra heads at 26' above proposed roadways.

Schedule: The company requires 2 weeks advance notice and 3 weeks to construct items 1 through 5.

Note:

1. Pole shall be placed 18" behind face of curb or as close to R.O.W. as practical.
1. No betterment work involved
2. Cobra head light fixtures can be drop globes or cutoffs. Other possible fixtures include:
 - GEM250R & M250A2 (Type 2 Distribution)
 - Holophane RSL200 Series (Verticals)
 - GE Expressway Floods

Verizon – Telephone

Existing Facilities

Alexander Road

1100 ft. ± of 200 pair 22 gauge copper cable
1100ft. ± service wire and connections
24 fiber cable
9 joint poles with electric, telephone, and cable
7 service poles

North Post Road

850 ft. of 400 pair 24 gauge copper cable
400 ft. of 200 pair 24 gauge and 22 gauge copper cable with service connections
18 joint pole with electric and cable

Work To Be Performed By Verizon

Temporary

1. Alexander Road Sta. 10 ± 50 Rt. (UP #2092WW) to 21 ± 08 Lt. (UP #PS1608WW).
Construct 3 Temporary poles from Sta. 11+33, 25' Lt. to 15 ± 00, 65' Lt.
Place 600' of 200 pair 22 gauge copper cable.
Place 800' of 5 pair service wire and rewire circuits.
Relocate 300' of 144-fiber cable from P60621 Old Bear Brook Road to PS3870 front of building #880.
Remove 1100' of existing copper and fiber cables.
Remove 3 Poles.

Permanent

Construct 2 Manholes.
Construct 280' of 2 duct structure.
Construct 1800' of 200 pair 22 gauge cable Sta. 10 ± 70 to 21 ± 60.

Temporary

2. North Post Road Sta. 15 ± 00 Rt. (UP #A62645WW) to Sta. 30 ± 00 Lt. (UP #60723WW)
Place 150' of 50 pair 24 gauge cable Sta. 12+65.
Relocate 300' of 144-fiber cable to temporary pole line.
Remove 850' of existing copper and fiber cables.

Permanent

Construct 900' 24 fiber cable from P60621 to PS3870.

Construct 300' of 400x24, 200x24, and 200x22 copper cable at intersection of Alexander & Wallace Road.
Relocate cables along North Post Road to new poles.

Permanent

3. Alexander Road and North Post Road
Remove 2000' to temporary poles.
Remove 2700' of existing cable.
Remove 17 poles.

Schedule: The company requires 2 weeks advance notice and 3 weeks to construct items 1 through 3.

Note:

1. Pole shall be placed 18" behind face of curb or as close to R.O.W. as practical.
2. No betterment work involved.

Worldcom – Telephone

Existing Facilities

Alexander Road

1100 ft. $\pm$ fiber cable
11 joint poles with Electric, Telephone, and Cable

North Post Road

750 ft. of 13 KV primary
6 joint pole with telephone and cable

Work To Be Done By Worldcom

1. Alexander Road Sta. 10 $\pm$ 50 Rt. (UP #2092WW) to 21 $\pm$ 08 Lt. (UP#PS1608WW).
Construct 1100' of temporary fiber cable from Sta. 11+33 Lt. to Sta. 20+55 Lt.
Construct 1100' of fiber cable from Sta. 11+70 Lt. to Sta. 20+60 Lt.
Remove existing aerial facilities.
2. North Post Road Sta. 15 $\pm$ 00 Rt. (UP #A62645WW) to Sta. 30 $\pm$ 00 Lt. (UP #60723WW).
Construct 500' of fiber cable.

Schedule: The company requires 2 weeks advance notice and 3 weeks to construct items 1 and 2.

Note:

1. Pole shall be placed 18" behind face of curb or as close to R.O.W. as practical.
2. No betterment work involved.

Comcast -Cable

Existing Facilities

Alexander Road

1100 ft. $\pm$ of cable and fiber optic cable
11 joint poles with Electric and Telephone

North Post Road

1500 ft. of cable and fiber optic cable
18 joint pole with Electric and Telephone

Work To Be Done By Comcast

1. Alexander Road Sta. 10 ± 50 Rt. (UP #2092WW) to 21 ± 08 Lt. (UP #PS1608WW).
Construct 1100' of temporary cable and fiber optic cable.
Construct 1100' of permanent cable and fiber optic cable.
Remove existing cable and fiber optic cable.

North Post Road St. 15 ± 00 Rt. (UP #A62645WW) to Sta. 30 ± 00 Lt. (UP #60723WW).
Construct 1500' ± of cable and fiber optic wire.
Remove existing cable and fiber optic cable.

Schedule: The company requires 2 weeks advance notice and 3 weeks to construct items 1 and 2.

Note:

1. Pole shall be placed 18" behind face of curb or as close to R.O.W. as practical.
2. No betterment work involved.

Public Service Electric & Gas – Gas

Existing Facilities

Alexander Road

750' of 12" steel pipe

North Post Road

850' of 12" steel pipe

600' of 6" steel pipe

Old Bear Brook Road

200' of 12" steel pipe

Work To Be Done By PSE&G – Gas (Phase 1)

1. Install 120', 16" steel casing under Amtrak's Northeast corridor in conjunction with water line relocation operation.
Install 192' of 12" steel gas pipe. Gas carrier pipe will be pushed through the steel casing before the pits are backfilled. Placement of pipe will extend past the zone of influence for the existing building.

Schedule: Included in NJAW contractor's construction operation for relocation of the existing 16" water main. Operation will take 3 months to complete.

Note: Building located in vicinity of operation will be sheeted, shored, underpinned during installation. Building will be monitored for settlement.

Work To Be Done By PSE&G – Gas (Phase 2)

2. Install 541' of 12" steel gas pipe from end of phase 1 construction to Old Bear Brook Road tie-in.
Install gas valve at Old Bear Brook tie-in.
Install gas valve for residential tie-in.
3. Install 688' of 12" steel gas pipe from end of phase 1 construction to a point along the proposed alignment, housed with a gas valve, and follows the proposed alignment to a connection valve with North Post Road.
Install gas valve at 90° turn at proposed North Post Road.
Install gas valve at existing North Post Road tie-in.
4. Install 89' of 6" steel gas pipe.
Install gas valve at North Post Road tie-in.

Install gas valve at Alexander Road tie-in.
Remove existing 12" steel gas pipe.
Remove existing 6" steel gas pipe section.

Schedule: Included in Contractor's overall construction operation.

Note: Partnership process will be utilized with utility for above construction operations.

- 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.

<u>Location</u>	<u>Speed</u>	<u>Number Per Day</u>	<u>Time</u>
Amtrak's Northeast Corridor	70+ mph	50 and varies (2 center tracks)	Every 30 Mins.
New Jersey Transit	<10-30+ mph	50 and varies(2 outside tracks)	Every 15 Mins.

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

THE FOLLOWING SECTION IS ADDED:

3. Amtrak Requirements. Work performed on or adjacent to Amtrak property include, but are not limited to, the following requirements, unless otherwise specifically authorized by an on-site qualified Amtrak employee.

- All workers shall maintain a distance of no less than 25' from the centerline of the track without special provision and the appropriate flagging protection.
- Any tools and equipment being utilized shall not extend closer than 25' from the track.
- When a train is approaching, all workers shall cease work, stand clear of the track, and face the approaching train.
- No worker is permitted to cross the railroad track at any area other than the designated crossings.
- No tools or working materials are permitted to be left along Amtrak right-of-way.
- In no event shall equipment or material be transported across a track without special permission and appropriate Amtrak flagging protection.
- All personnel, equipment and materials to be used during the construction shall be kept at all times at least 15' from all electrical, signal and communication lines.

Track Monitoring

Scope. If any work that could potentially affect the stability of the track is occurring within 50 feet of a track, or within the influence line of the track, then monitoring points shall be established along the track. The influence line descends from a point one foot horizontally away from the outside end of the tie bottom one unit vertically for every unit and a half horizontally.

Safety. All work close enough to foul a track must only be performed under the direction of qualified railroad personnel. People performing track monitoring are classified as Roadway Workers and must be trained in Roadway Worker Protection.

Points. Each location shall include a point on the top of the rail marked with paint or crayon on the field side of the rail and used for vertical measurements, and a point on the tie for horizontal measurements. In

wood ties, the point shall be marked with a PK nail or similar surveyor's marker; on concrete or steel ties the point shall be marked with paint.

Point Locations. Reference points shall be established along the track beginning at the point where the work is closest to the track. Points shall continue to be placed at intervals of 50 feet, 100 feet, and 200 feet away from the end point(s). Where more than one track may be affected, points shall be established on each track that could be affected.

Measurement Accuracy. Monitoring points shall be established to within 0.001 feet, and monitoring shall be done to 0.01 feet.

Monitoring. Monitoring shall be performed at the beginning and end of every shift of work. Points shall be measured, the measurements recorded, and the numbers compared with previous measurements. All points shall be measured each time monitoring occurs, except for the points 200 feet away from the end of work; these points shall only be measured if any of the other measurements exceeds an allowable deviation.

Allowable Deviation. If track is found to have moved either vertically or horizontally by more than one half of the Amtrak Maintenance limits as specified in Amtrak's MW-1000 for the particular class of track involved, then all work shall cease immediately and the contractor shall immediately notify the designated Amtrak Project Engineer. Work may not resume until the designated Amtrak Project Engineer has inspected the site and approved.

Track Maintenance. Deficiencies in track surface and alignment caused by construction activities shall be corrected solely by Amtrak forces at project expense.

For other rules, regulations, general requirements and provisions including, but not limited to, Amtrak Safety Training for contractor and Department staff, insurance requirements, protection of tracks and wires, safety, training, track outages, etc., refer to the document "Amtrak Contract Requirements/Specifications" attached to this document.

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 FIRST PARAGRAPH IS CHANGED TO:

Type A field office shall be of weatherproof construction located adjacent to the contractor's field office having a floor area of not less than 576 square feet and a ceiling height of not less than 7½ feet, and having partitions and doors providing three communicating rooms, one with a floor area of not less than 288 square feet and two with a floor area of not less than 144 square feet each.

(17)

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

(17) A microcomputer system compatible with the Department's "ACES" system, whether purchased new or previously used.

THE FIFTH PARAGRAPH IS CHANGED TO:

The microcomputer system (after the project data has been erased from the hard drive by the Department), manuals, instructions, software, and literature shall be removed and retained by the Contractor when no longer required as determined by the

Resident Engineer. The data cartridges and data diskettes will become the property of the State.

THE FOLLOWING ARE ADDED TO PART (17)

The microcomputer system shall include the following:

(a) _____ base computer system(s) having at minimum:

- 1) Pentium IV Processor at 3.5 GHz or faster, Intel processor with Hyper Threading technology, with 1024 MB RAM, 512 MB Video RAM, mouse, mouse pad, 200 Gigabyte hard drive or larger (must be designated as drive C:), one DVD (+/-) Writer Drive, one CD-R Recordable Drive, and one 3½-inch, 1.44 MB floppy diskette drive with multi-media card reader installed as the "A" drive. System must be USB 2.0 compactable.
- 2) 56K baud data/fax modem. (e.g., 3Com U.S. Robotics 56K Fax modem, 3Com U.S. Robotics Courier V.Everything/V.34 - 56K ITU / x2 Technology, or Hayes Accura 56K).
- 3) One wireless network card for each base computer system specified, when more than one base computer is specified.
- 4) One wireless Ethernet Hub Switch with appropriate number of ports and cables (e.g. Lynksys) and a print server.
- 5) One dedicated telephone line per computer to be used in conjunction with each of the microcomputer modem.
- 6) One high-speed broad band connection with a minimum speed of 3 Megabytes per second (mbps) with dynamic IP address per field office (DSL, Cable, etc.) for the duration of the project.
- 7) 19 inch or larger Flat Screen LCD monitor with tilt/swivel capabilities.
- 8) 250 Megabyte or larger Zip Drive internal or external with backup software for MS-Windows and DOS, and fifteen corresponding formatted data cartridges corresponding to the tape drive size (e.g., Iomega Zip Drive or equivalent).
- 9) 10 USB 1 GB Flash/Stick/Jump Memory Drives. (e.g. SanDisk Cruzer Micro 1 Gigabyte).
- 10) One Flatbed USB version 2.0 or greater Color Scanner. (e.g. H.P. or Cannon)
- 11) Uninterruptible power supply (UPS) - OMNI 1000 or approved equal (e.g., APC-1000 - American Power Corporation).
- 12) 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).
- 13) Static mat, floor type, 4 by 5 feet or larger with grounding capabilities.
- 14) Computer workstation, printer stand, and/or table having both appropriate surface and chair height.
- 15) Five boxes of 3½-inch floppy diskettes that match the drive density of the 1.44 MB floppy diskette drive (ten per box).
- 16) 150 CD-R 700 MB (or larger) recordable CD's compatible to the CD drive and 100 recordable DVD's.
- 17) One floppy diskette holder (holds 50, 3½-inch floppy diskettes), and dust covers for the microcomputer, monitor, keyboard, and printer.
- 18) Two head cleaner kit for 3½-inch floppy diskette drive.
- 19) One can of compressed air and screen cleaning solution every other month of the duration of the project.

(b) One base printer having at minimum:

- 1) Color laser printer having HP PCL 5 emulation, with a minimum of 192 Megabytes of expanded memory, appropriate printer cable, and legal size paper tray (e.g., HP Color LaserJet 2500N or TN).
- 2) One set of appropriate printer toner cartridges every other month for the duration of the construction project.

- 3) One ten-ream carton of 8½" X 11" size paper (500 sheets per ream, weight: 2.2 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 ten-ream carton of legal size paper (500 sheets per ream, weight: 2.2 ounces per square yard, color: white, grain: long, for laser printers and copiers) every three months for the duration of the construction project.
- (c) One software package, on CD-ROM with documentation, including:
 - 1) Microsoft Windows, latest version with future upgrades for the duration of the entire project.
 - 2) Microsoft Office Professional latest version. Software package should contain the following: word processor, spreadsheet, and database.
 - 3) Norton's System Works for Windows, latest version, or compatible software package with future upgrades and latest virus patches.
 - 4) Anti-Virus software, latest version with monthly updates for the duration of the entire project (e.g., McAfee Anti Virus, Dr. Solomon's, or Norton's Anti Virus).
 - 5) Visio Professional Graphics Software for Windows, latest version.

THE FOLLOWING SENTENCE IS ADDED:

- (d) 1) Printer and Flatbed Scanner may be all in one printer/scanner/fax with automatic paper feed.

THE FOLLOWING IS CHANGED TO:

- (e) 1 Primavera Project Planner (P3) or equivalent software, latest version.

a. Type A. (1)

PART (1) IS CHANGED TO:

- (1) ___ multi-line touch-tone telephones and ___ telephone lines for use with the telephones installed as directed and operational in the Field Office and other facilities specified.
- (a) ___ 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) ___ portable hand held cellular phone(s). 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
 - 19) Hands-Free headset
- (c) ___ 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) ___ telephone answering machine

- (a) ___ 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) X 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:

THE FOLLOWING IS ADDED:

- (18)___ TV/VCR (Video Cassette Recorder) Combo with: 4-head VCR, crystal-clear-slow-motion, still frame, and frame advance, and index search.
- (19)___ video camcorder with video tripod, extra battery, battery charger, capability to play video tape on standard VCR Player, and one blank video cassette tape per month.

105.19 Maintenance During Construction.

THE THIRD PARAGRAPHS 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. aa

THE ENTIRE PART AA TEXT ARE CHANGED TO:

- aa Microcomputer workstation hardware and software requirements as indicated. The microcomputer system shall include the following:
 - (1) One base computer system(s) having at minimum:
 - a) Pentium IV Processor at 3.5 GHz or faster, Intel processor with Hyper Threading technology, with 1024 MB RAM, 512 MB Video RAM, mouse, mouse pad, 200 Gigabyte hard drive or larger (must be designated as drive C:), one DVD (+/-) Writer Drive, one CD-R Recordable Drive, and one 3½-inch, 1.44 MB floppy diskette drive with multi-media card reader installed as the “A” drive. System must be USB 2.0 compactable.
 - b) 56K baud data/fax modem. (e.g., 3Com U.S. Robotics 56K Fax modem, 3Com U.S. Robotics Courier V.Everything/V.34 - 56K ITU / x2 Technology, or Hayes Accura 56K).
 - c) One wireless network card for each base computer system specified, when more than one base computer is specified.
 - d) One wireless Ethernet Hub Switch with appropriate number of ports and cables (e.g. Lynksys) and a print server.
 - e) One dedicated telephone line per computer to be used in conjunction with each of the microcomputer modem.
 - f) One high-speed broad band connection with a minimum speed of 3 Megabytes per second (mbps) with dynamic IP address per field office (DSL, Cable, etc.) for the duration of the project.
 - g) 19 inch or larger Flat Screen LCD monitor with tilt/swivel capabilities.
 - h) 250 Megabyte or larger Zip Drive internal or external with backup software for MS-Windows and DOS, and fifteen corresponding formatted data

cartridges corresponding to the tape drive size (e.g., Iomega Zip Drive or equivalent).

- i) 10 USB 1 GB Flash/Stick/Jump Memory Drives. (e.g. SanDisk Cruzer Micro 1 Gigabyte).
 - j) One Flatbed USB version 2.0 or greater Color Scanner. (e.g. H.P. or Cannon)
 - k) Uninterruptible power supply (UPS) - OMNI 1000 or approved equal (e.g., APC-1000 - American Power Corporation).
 - l) 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).
 - m) Static mat, floor type, 4 by 5 feet or larger with grounding capabilities.
 - n) Computer workstation, printer stand, and/or table having both appropriate surface and chair height.
 - o) Five boxes of 3½-inch floppy diskettes that match the drive density of the 1.44 MB floppy diskette drive (ten per box).
 - p) 150 CD-R 700 MB (or larger) recordable CD's compatible to the CD drive and 100 recordable DVD's.
 - q) One floppy diskette holder (holds 50, 3½-inch floppy diskettes), and dust covers for the microcomputer, monitor, keyboard, and printer.
 - r) Two head cleaner kit for 3½-inch floppy diskette drive.
 - s) One can of compressed air and screen cleaning solution every other month of the duration of the project.
- (2) One base printer having at minimum:
- a) Color laser printer having HP PCL 5 emulation, with a minimum of 192 Megabytes of expanded memory, appropriate printer cable, and legal size paper tray (e.g., HP Color LaserJet 2500N or TN).
 - b) One set of appropriate printer toner cartridges every other month for the duration of the construction project.
 - c) One ten-ream carton of 8½" X 11" size paper (500 sheets per ream, weight: 2.2 ounces per square yard, color: white, grain: long, for laser printers and copiers) every two months for the duration of the construction project.
 - d) One ten-ream carton of legal size paper (500 sheets per ream, weight: 2.2 ounces per square yard, color: white, grain: long, for laser printers and copiers) every three months for the duration of the construction project.
- (3) One software package, on CD-ROM with documentation, including:
- a) Microsoft Windows, latest version with future upgrades for the duration of the entire project.
 - b) Microsoft Office Professional latest version. Software package should contain the following: word processor, spreadsheet, and database.
 - c) Norton's System Works for Windows, latest version, or compatible software package with future upgrades and latest virus patches.
 - d) Anti-Virus software, latest version with monthly updates for the duration of the entire project (e.g., McAfee Anti Virus, Dr. Solomon's, or Norton's Anti Virus).
 - e) Visio Professional Graphics Software for Windows, latest version.

Hardware and software shall be acceptable to the Regional Construction and Resident Engineers before purchase/installation. All software shall be compatible with the computer's operating system.

The microcomputer system, whether purchased new or previously used, shall be installed in the materials field laboratory.

At the time of installation, the Contractor shall ensure that the system is fully operational and meets all Department requirements. All software listed above shall be installed by the Contractor and maintained in the materials field laboratory. The Contractor shall configure the software to operate with the hardware provided. Any accessories for the microcomputer shall be compatible with the microcomputer.

The Contractor will not be permitted to use this microcomputer system at any time. It is being supplied solely for the Department's use.

The Contractor shall forward all manuals, instructions, software, and literature received with the microcomputer system to the Resident Engineer. The Contractor is responsible for maintaining the microcomputer system in good working condition. Any part of the microcomputer system that becomes inoperable or defective, during the duration of the construction project, shall be replaced by the Contractor within 48 hours.

The microcomputer system (after the project data has been erased from the hard drive by the Department), manuals, instructions, software, and literature shall be removed and retained by the Contractor when no longer required as determined by the Resident Engineer. The data cartridges and data diskettes will become the property of the State.

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:

<i>Pay Item</i>	<i>Pay Unit</i>
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.

106.13 Fuel Price Adjustment.

THE FIFTH PARAGRAPH IS CHANGED TO:

The monthly fuel price index will be posted every month on the Department's web site: www.state.nj.us/transportation/eng/CCEPM/PriceIndex.shtm.

THE FIRST SENTENCE OF THE SIXTH PARAGRAPH IS CHANGED TO:

The basic fuel price index will be the previous month's fuel price index before receipt of bids.

THE EIGHTH PARAGRAPH IS DELETED:

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 exist 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.

107.22 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.

107.23 Insurance.

West Windsor Township and Mercer County shall also be included as the named insured on the comprehensive general liability and owner's protective insurance policies.

6. Railroad Insurance.

Insurance coverage shall be procured and maintained for the following railroad(s):

National Railroad Passenger Corporation (AMTRAK)

It is estimated that 60% percent of the Project cost is located within or adjacent to the railroad right-of-way.

SECTION 108 - PROSECUTION AND PROGRESS

108.02 Subcontracting.

There are no Specialty Items in this Project.

Specialty Items are as listed below:

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. 20 State Business Days will be required for review and certification or rejection and return of fabrication working drawings. 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.

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:

<i>Pay Item</i>	<i>Pay Unit</i>
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:

<i>Pay Item</i>	<i>Pay Unit</i>
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.

108.10 Time of Completion.

- A. All work required for Substantial Completion of the Project shall be completed on or before October 30, 2007.
- B. The entire Work of the Project shall be completed on or before November 30, 2007.
- A. Stage 2 of construction will be completed in less than 90 Calendar Days.
- B. Proposed reconstruction of West Windsor Parking Lot must be completed in the summer months. (June-August 31)

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 ____ for road work and ____ 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.

THIS SUBSECTION IS CHANGED TO:

A. Basis for Extension. Where appropriate under the provisions of this Subsection, 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 current controlling operations and the overall Completion. Increases or decreases in Work or such delays, which do not affect the overall Completion, are not to be the basis for reduction or extension of Contract Time. Extensions of Contract Time will not be granted under this Subsection where it is determined that the Contractor could have avoided the circumstances which caused the request for extension.

If the Contractor is delayed in completion of the Work by reason of changes made under Subsection 104.02, or by failure of the Department to acquire right-of-way, or by any act of other contractors consistent with Subsection 105.10, or due to the discovery of archeological finds consistent with Subsection 108.13, or the discovery of hazardous substances, or by any act of the Engineer or of the Department not contemplated by the Contract, an extension of Contract Time commensurate with the delay in overall completion of the Contract thus caused will be granted, and the Contractor is relieved from any claim for liquidated damages or engineering and inspection charges.

Additionally, the Contractor may be granted an extension of Contract Time and not be assessed liquidated damages or the costs of engineering and inspection for any portion of the delay in overall completion of the Work beyond the time provided in Subsection 108.10 caused by the following reasons:

1. acts of civil or military authorities, war, or riot;
2. fire;
3. floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes, or other cataclysmic natural phenomenon (except on working day contracts);
4. extreme weather conditions (see Item 1 of the fourth paragraph) (except on working day contracts);
5. epidemics or quarantine restrictions;
6. strikes or labor disputes beyond the control of the Contractor which prevent work on the construction operations which are critical to the completion of the Project;
7. shortages of materials (see Item 2 of the fourth paragraph) or freight embargoes;
8. acts of the State in its sovereign capacity;
9. failure of the Engineer to furnish interpretations of the Contract Documents (see Item 3 of the fourth paragraph).

B. Criteria for Evaluation. Extension of Contract Time for the reasons set forth in this Subsection will not be granted unless the Contractor has notified the 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 Engineer will evaluate the facts and the extent of the delay, and the Engineer's findings will be final and conclusive and will be based on the following:

1. Extensions of Contract Time for extreme weather conditions will be granted in accordance with the following:

Number of Days the Contractor's Work is Limited to in One Month as the Result of Extreme Weather Conditions (April through November inclusive)	Extension of Contract Time Allowable
16 - 31	0
15	1
14	2
13	3
12	4
11	5
10	6
9	7
8	8
7	9
6	10
5	11
4	12
3	13
2	14
1	15
0	16

Extensions of Contract Time for extreme weather conditions will be granted in accordance with the following for the months of December through March inclusive:

It is anticipated that the average number of total Working Days during this four month winter period is for road work (Exclusive of temperature sensitive work, for example but not limited to, paving operations, earthwork, aggregates, curb and sidewalk, etc.) and for bridge work (Exclusive of temperature sensitive work, for example but not limited to, concrete decks, parapets, bridge repairs, bridge painting, etc.)

In using the above, the Engineer will:

- a. Consider days for which an extension is granted under the above category "floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes, or other cataclysmic natural phenomenon" as days on which the Contractor's work is limited as the result of these extreme weather conditions;
 - b. Consider days for which an extension is granted under the above categories for causes other than "floods, tidal waves, earthquakes, cyclones, tornadoes, hurricanes, or other cataclysmic natural phenomenon" as days on which the Contractor worked and was unaffected by extreme weather conditions; and
 - c. Make the above calculation based on the full number of days in the calendar month as being days on which the Contractor could have worked without regard to Saturdays, Sundays, and holidays.
 - d. Extension of time for extreme weather conditions will only be granted when the Critical Path of the Progress Schedule is affected and documented by the contractor in accordance with Subsection 108.04. No extension of time will be granted unless the Contractor submits daily documentation of such extreme weather.
2. Extensions of Contract Time will not be granted for a delay caused by a shortage of materials unless the Contractor furnishes:
- a. Documentary proof that it has diligently made every effort to obtain such materials from all known sources within reasonable distance from the Work, and
 - b. Further proof in the form of a progress schedule, as required in Subsection 108.04, showing that the inability to obtain such materials when originally planned, did, in fact, delayed the date of Completion which 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 until 20 State Business Days after receipt of such demand in writing as required by Subsections 105.01 and 105.07, and not then unless such request for an interpretation of the Contract Documents is reasonable and made in good faith, and the failure to respond was unwarranted.
4. It is understood and agreed that the Contractor has considered in its bid all of the permanent and temporary utility facilities in their present or relocated positions as may be shown on Plans, as described in Specifications and as revealed by its site investigation; is aware that utility company service demands, adverse field conditions and emergencies may affect the owner's ability to comply with the proposed schedules for utility work; and is cognizant of the limited ability of the State to control the actions of the utility companies, including the actions of railroads, and has made allowances in its bid. Extensions of Contract Time will be granted for extreme weather and exigent circumstances only, as specifically set forth above and which are outside the control of the respective utility company(ies) or the Contractor as determined by the Engineer utilizing the Extreme Weather provisions specified in 1. above. Extension of time for utility work will only be granted when the Critical Path of the Progress Schedule is affected and documented by the Contractor in accordance with Subsection 108.04.

Except where specifically provided in the Contract Documents, the Contractor shall not make any claim for damages or additional compensation for any delay in or hindrance to the performance of the Contract occasioned by any act or omission to act by the State or any of its representatives, or for any of the reasons enumerated in this Subsection and agrees that any such claim shall be fully compensated for by an extension of Contract Time to complete performance of the Work.

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, men, 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, as a result of modifications made under Subsection 104.02, 104.05, 104.06, or 108.09, the Work required is reduced or altered so that the time required for Completion is reduced, the Engineer may reduce the Contract Time provided under Subsection 108.10. The Engineer will evaluate the facts and the extent of the reduction. The Engineer's findings thereon will be final and conclusive.

It is the intention of the above provisions that the Contractor or surety is not relieved of liability for liquidated damages or engineering and inspection charges for any period of delay in Completion in excess of that expressly provided for in this Subsection.

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.

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 the Work as specified in Subpart A 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 \$1,000.
2. For each Calendar Day that the Contractor fails to complete the entire Work of the Project as specified in Subpart B 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 \$500, provided that the Work as specified for Substantial Completion is actually completed.

THE FOLLOWING IS ADDED:

3. The contractor shall have 90 days from the date of road closure to the date of road re-opening to complete Stage 2 construction. If the Contractor fails to complete this work in Stage 2, the Contractor shall pay liquidated damages consisting of Road User Costs and Construction Engineering Costs to the State in the amount of \$4,400/day.

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. As provided for in the Special Provisions.

No Incentive Payment for Early Completion is specified for this project

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.

LIQUIDATED DAMAGES SHALL BE AS FOLLOWS:

1. For each Calendar Day that the Contractor fails to complete Construction Operations, as specified in Item A 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, as defined in Subsection 101.03, to the State in the amount of \$1,000 per day.
2. For each Calendar Day that the Contractor fails to complete the entire Work of the Project as specified in Item B of Subsection 108.10 of these Special Provisions, for Completion, the Contractor shall pay liquidated damages consisting of Construction Engineering Costs, as defined in Subsection 101.03, to the State in the amount of \$1,000 per day, provided that Construction Operations as specified for Substantial Completion are actually completed.

The days in default set forth above are the number of Calendar Days in default when the time for Completion is specified on the basis of Calendar Days or a specified completion date, and are the number of Working Days in default when the time for Completion is specified on the basis of Working Days.

Anytime after the Engineer notifies the Contractor in writing, that Substantial Completion of the Project has been actually achieved, the Commissioner may elect, to waive the imposition of liquidated damages under paragraph number 2 above and, in lieu thereof, require the Contractor to pay the actual costs incurred by the State for engineering, inspection, and administration (including overhead) between the actual date of Substantial Completion or such subsequent date as the Commissioner may determine and the actual date of Completion of all Work, as established by the Certificate of Completion. The Contractor hereby waives the right to challenge this election by the Commissioner on the grounds that such costs exceed the amount of liquidated damages specified in Subsection 108.16, Subpart 2.

The Commissioner will recover all 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.

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

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.

5. Profit. Profit shall be computed at ten percent of the following:

SUBPART C. IS ADDED AS FOLLOWS:

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

6. Overhead.

THE FIRST SENTENCE IS CHANGED TO:

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

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

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

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.

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:

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.

In no case shall the temporary shielding reduce the existing underclearances of the bridges to less than 14 feet – 9 inches over roadways and 22 feet over railroads. If any existing underclearance is less than these values, it shall be maintained without any further reduction.

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.

It is the Contractor's responsibility to ensure the structural integrity and continuous operation of the railroad's electrified lines, their supports, and appurtenances.

The Contractor shall comply with the railroad's maintenance of traffic requirements, rules, and regulations.

A 6-inch minimum clearance to a catenary wire shall be maintained. An electrification shutdown by the railroad on a track-by-track basis shall allow for construction of the special protection systems.

List of Materials

<u>Item</u>	<u>Description</u>	<u>Quantity Required</u>
1.	U-bolt, 7/8-inch diameter by 4-inch, BS fastener	-----
2.	Strap, clevis, 1¼ by 2 inches stock, 12-inch connecting length, 1-inch diameter hole, 5/8-inch diameter bolt, ultimate strength 25 psi, Brewer Tilchener Corp.-3074 C	-----
3.	Dead end eye bolt, compression type steel, use DIE 6010SH, compression tool, 60A ALCOA 9190-332	-----
4.	Jumper cable, compression type aluminum, use DIE 6020AH, compression tool 60A ALCOA 5120-781	-----
5.	Terminal - Bundy AK2C39B1 to 336400 Cable (1)	-----
6.	Ground terminal - Bundy AK2C39B1 to 336400 Cable (2)	-----
7.	Terminal - solid barrier to 0.17 square inch cable Bundy KC28B1	-----
8.	Compound, aluminum to copper connection (ALNOX) CANS	-----
9.	Termination, dead end strand clamp, ALCO 336 4 KCM	-----
10.	Clip, bronze, complete type BC, Ohio brass	-----
11.	Thimble-Bronx 336 4 KCM	-----
12.	U-bolt, 1¼-inch diameter by 1½-inch loop 336 4 KCM 11, 30/7 STR ACSR, ANACONDA insulated aluminum cable having a diameter of 0.17 square inches, ANACONDA	-----

The solid overhead barrier shall be grounded to the main girders at two locations on each side of the bridge with 336400 bare aluminum cable. Terminals, connectors, and hardware shall be compatible for cable to steel connections.

The top rail of the solid overhead barrier shall be bonded at all splices with insulated aluminum cable having a diameter of 0.17 square inches, seven-strand polyethylene weatherproof insulation. Terminals and hardware shall be compatible for the cable to steel connections.

The temporary protective shield shall be bonded with copper cable having a diameter of 0.17 square inches. Terminals and hardware shall be compatible for the cable and connected material. One cable having a diameter of 0.17 square inches shall be placed on top of the shield and run the full length of the shield. The barrier shall be grounded to the girders at each end.

The Contractor shall remove concrete from existing fascia girders and drill holes for the necessary connection to the grounding system as shown on the Plans.

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 \$_____ will not be made until Completion.
THE FOLLOWING IS ADDED AFTER THE THIRD PARAGRAPH:

Payment for the Pay Item "Clearing Site, Bridge (____)" in excess of \$175,000 will not be made until Substantial Completion.

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

SECTION 202 - ROADWAY EXCAVATION

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 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".

THE FOLLOWING ITEM WAS ADDED:

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 RE 10 days before first concrete pour. Provide concrete washout facilities to prevent escape of discharge from concrete trucks or equipment cleaning to surface for 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 plans. Use signs to designate concrete washout areas.

Ensure that the facility complies with Federal, State, and local laws, rules, and regulations. Ensure that the washout area is in place before delivery of concrete to the site. Ensure that concrete washout is limited to 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.

Method of Measurement and Payment

Measurement and payment will be as follows:

Pay Item

CONCRETE WASHOUT FACILITY

Pay Unit

LUMP SUM

SECTION 203 - EMBANKMENT

203.05 Construction Requirements.

Drainage and Stability.

The following is added to this subsection:

The contractor shall install inclinometers in the locations as indicated in the contract drawings

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 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 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 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

203.13 Vertical Drain Method.**4. Installation of Vertical Wick Drains.** Vertical wick drain installation requirements are as follows:

- a. The Contractor shall furnish all necessary labor, equipment, and materials and perform all operations necessary for the installation of vertical drains in accordance with the details shown on the contract drawings and with the requirements of these specifications. The drains shall consist of a band-shaped plastic core enclosed in a suitable filter material and shall be spaced and arranged as shown on the plans or as otherwise directed by the Engineer.
- b. The vertical drain shall be a prefabricated type made up of a polypropylene drainage core wrapped in a filter made of a non-woven fabric of continuous filaments of 100% polypropylene similar to the product known as AMERDRAIN 407, or approved equal. The core shall be fabricated with suitable drainage channels.

The drain shall be manufacture and have the following minimum properties:

Drain			
Weight	0.8 oz/ft	75 gm/m	
Width	3.8 inches	95 mm	
Thickness	1/8 inch	3 mm	
Discharge capacity	1.5 gpm	90x10 ⁻⁶ m ³ /sec	ASTM D4716
Core			
Tensile strength	175 lbs	750N	ASTM D1621
Fabric			
Grab tensile strength	120 lbs	530N	ASTM D4632
Elongation at break	>70 %	>70 %	ASTM D4632
Trapezoidal tear	50 lbs	220N	ASTM D4533
Puncture strength	38 lbs	160N	ASTM D4833
Mullen burst	130 psi	900kPa	ASTM D3786
Specific Gravity	0.95	0.95	
Flow rate	70 gpm/ft ²	3,000 lpm/m ²	ASTM D4491
Permeability	0.02 cm/sec	0.02 cm/sec	ASTM D4491

The Contractor shall submit drain samples and indicate the source of the proposed materials prior to delivery to the site and shall allow sufficient time for the Engineer to evaluate the material.

- c. Drains shall be installed with approved equipment of a type which will cause a minimum of disturbance of the subsoil during the installation operation.

The prefabricated drains shall be installed using a mandrel or sleeve that will be advanced through the soil to the required depth. Constant load or constant rate of advancement methods are the preferred methods. A vibrator with an eccentric moment of at least 500 in-lbs shall be available for use in areas

where constant load or constant rate of advancement methods cannot install the drains to the design depths. Drains which cannot be installed to design penetration using only static methods must be advanced with the use of the vibrator to be considered for compensation. The vibrator may not be used except in cases where design penetration cannot be achieved by using the full static push force available to the mandrel. A drain may be abandoned before reaching design penetration when the rate of installation is less than 6 inches per second with the full static force and maximum vibrator output. Use of falling weight impact hammers will not be allowed. Provision must be provided for introducing water into the top of the mandrel. The mandrel shall protect the prefabricated drain material from tears, cuts, and abrasions during installation and shall be withdrawn after installation of the drain. The mandrel shall be rectangular in shape and of minimum cross sectional area not to exceed 12 in².

Prior to the installation of drains, the contractor shall submit to the Engineer for his review and approval, details of the sequence and method of installation. Approval by the Engineer will not relieve the Contractor of his responsibility to install drains in accordance with these specifications.

- d. Prior to the installation of drains within the designated area the Contractor shall demonstrate that his equipment, method and materials produce a satisfactory installation. For this purpose, the Contractor will be required to install trial drains at locations designated by the Engineer. Payment will be at the bid price per linear foot for the drains. Payment will not be made for installing any unsatisfactory trial drains.

As a minimum experience requirement, the contractor shall have successfully completed three vertical drain installation projects. The three projects shall be identified by project name, location, project description, size, completion date, and contract manager.

Approval by the Engineer of the method and equipment used to install the trial drains shall not constitute, necessarily, acceptance of the method for the remainder of the project. If at any time, the Engineer considers that the method of installation does not produce a satisfactory drain, the Contractor shall alter his method and/or equipment as necessary to comply with these specifications.

Drains will be located, numbered and staked out by the contractor and approved by the Engineer. The contractor shall take all reasonable precautions to preserve the stakes. The location of the drains shall not vary by more than 6 inches(150mm) from the locations indicated on the drawings or as directed by the Engineer.

Drains shall be installed from the working surface to the bottom of the clay layer as indicated in the geotechnical report or at the depth shown on the drawings, or to such a depth where the soil resists a reasonable effort at further penetration. The Engineer may vary the depths, spacing, or the number of drains to be installed, and may revise the plan limits for this work as necessary.

The equipment shall be carefully checked for plumbness prior to advancing each drain, and must not deviate more than 1 inch per foot from the vertical.

Drains that are out of their proper location by more than 6 inches or drains that are damaged in construction, or drains that are improperly completed shall be rejected by the Engineer, and no compensation will be allowed for any materials furnished or for any work performed on such drains.

The contractor shall provide suitable means of making a linear determination of the quantity of drain material used.

During installation of the drain, the contractor shall provide suitable means of determining the depth of each drain.

Splices or connections in the drainage material shall be done in a workmanlike manner and so as to insure continuity of drain material. There should be an 8 inch length of drain material protruding above the natural ground surface at each drain location. The drain material shall be cut neatly at its upper end.

The Contractor shall be permitted to use auguring or other methods to loosen stiff upper soils prior to the installation of the drains, provided that such auguring does not extend more than 2 feet into the underlying highly compressible soils.

Where obstructions are encountered below the working surface which cannot be penetrated using normal and accepted procedures, the Contractor shall complete the drain from the elevation of the obstruction to the working surface and notify the Engineer's representative. At the direction of the Engineer, the Contractor shall then install a new drain within 18 inches from the obstructed drain. The Contractor shall be paid for all obstructed drains at the contract unit price unless the drain is improperly completed.

The contractor shall place various monitoring devices at the locations and depths indicated on the contract drawings. Installation of the piezometers shall be maintained and protected from damage throughout the course of the project. The Contractor shall replace at his cost any equipment that is damaged or becomes unreliable as a result of his negligence.

GEOTECHNICAL INSTRUMENTATION AND MONITORING

203.17 Monitoring Description.

This work shall include furnishing labor, transportation, equipment, materials, and incidentals necessary for installing, and maintaining instrumentation required to observe ground movements and pore pressure levels during preloading and overload operations. Monitoring of selected instrumentation will be as required as specified herein.

Protect and maintain instrumentation throughout the Contract, or until directed otherwise by the Engineer.

No instrumentation installation shall take place before review by the Engineer of instrumentation submittals. No Zone 1 blanket placement, vertical wick installation, or embankment fill placement shall take place until instrumentation installation has been completed and approved by the Engineer and initial readings taken for each instrument.

Responsibilities of Contractor shall include, but not be limited to, the following:

1. Taking initial readings of all installed instrumentation. All initial readings shall be taken jointly with the Engineer.
2. Furnish components of instrumentation that are to be installed during construction.
3. Furnish portable readout units for the Engineer's use.
4. Install instruments. Monitor the control stakes, settlement platforms, and deformation monitoring points as specified herein.
5. Perform and report the results of pre-installation and post installation acceptance tests.
6. Protect instruments from damage and maintain instruments installed, both by Contractor and existing instruments installed by others. Repair or replace damaged or inoperative instruments at no cost to the State.
7. Maintain and calibrate probes and portable readout units for Engineer's use.
8. Provide access to the Engineer for data collection.
9. Coordinate with the Engineer to verify consistency of collected data.
10. Data from the instrument readout units should be forwarded to the Geotechnical Engineering Unit of the NJDOT.

Description of Instruments:

1. Settlement platforms are surface displacement reference platforms placed on the prepared ground surface as shown on the Plans and before placement of the Zone 1 blanket or overload fill. A settlement plate consists of a square steel plate to which risers are attached. The risers are extended as the embankment and overload is placed. Settlement platforms are monitored by optical survey methods to determine vertical displacements occurring during and after embankment and overload fill placement. Contractor shall monitor the settlement platforms.
2. Vibrating wire piezometers consist of one vibrating wire pore pressure transducer placed in a borehole at designated depths. Pore pressures within the compressible soils shall be monitored with the piezometers during and after construction. The signal cable is extended to a readout terminal beyond the limits of the

embankment and overload. At six (6) piezometer locations (with eight piezometer transducers, as shown on the plans), as designated by the Engineer, will be required to measure the induced pore pressure. The Engineer shall monitor the vibrating wire piezometers.

3. Control stakes consist of alignment and displacement reference stakes placed at the toe of the overload fill and before placement of the Zone 1 blanket or embankment. A control stake consists of a wood cross-marked with graduated vertical and lateral reference scales. Control stakes are monitored by optical survey methods to determine vertical and lateral displacements occurring during and after overload fill placement. The Contractor shall monitor the control stakes.
4. Groundwater observation wells consist of PVC pipes with perforated bottom sections embedded in a zone of granular filter medium. The groundwater observation wells are installed within a vertical borehole to measure ground water levels. The groundwater observation well riser pipe is extended as the fill is placed. The Engineer shall monitor the groundwater observation wells

203.18 Purpose of Instrument Monitoring:

1. To provide reliable information for the Engineer to assess the overload and embankment stability, ground movements, and pore pressures resulting from overload and embankment fill placement.
2. To permit timely implementation of proper remedial measures when and as required to prevent slope stability failures, and damage to existing structures, roadways, equipment and utilities. Remedial measures may include modification of construction procedures or suspension of filling operation.
3. To provide reliable information for the Engineer to determine the rate of settlements and pore pressure dissipation after surcharge placement in order to evaluate the performance of the overload.
4. To permit the Engineer to evaluate the actual time period for which the surcharge is required to achieve the desired degree of consolidation of the underlying compressible soil.
5. To document ground movements and overload performance.
6. To monitor lateral movements of embankment widening for stability.

203.19 Quality Assurance.

A. Reference Standards:

American Society for Testing Materials (ASTM)

ASTM A36	Carbon Structural Steel.
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
ASTM C109	Compressive Strength of Hydraulic Cement Mortars Using 2 inch Cube Specimens.
ASTM C827	Early Volume Change of Cementitious Mixtures.
ASTM C1557	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10 pound Rammer and 18 inch Drop.
ASTM D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D3017	Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D1586	Penetration Test and Split-Barrel Sampling of Soils.
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
ASTM D2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System).

B. Control of Materials:

1. The Engineer reserves the right to approve each of the materials to be used in fulfilling the requirements of instrumentation work. Approval of the materials to be used for instrumentation shall not relieve Contractor of the responsibility to provide instrumentation in accordance with these Special Provisions.
2. The Engineer reserves the right to inspect, test) and approve the workmanship of the instrumentation equipment and materials.
3. A final quality assurance inspection shall be made before shipment. During the inspection a checklist shall be completed to indicate each inspection and test detail. A completed copy of the checklist shall be supplied with each instrument.
4. Contractor shall provide the manufacturer's warranty for each portable readout unit furnished.

C. Field Monitoring:

1. The Engineer reserves the right to approve the method of installation and maintenance of monitoring devices. Approval of the method of installation and maintenance of monitoring devices shall not relieve Contractor of the responsibility to install and maintain the instruments in conformance with the Specifications.
 2. The Engineer shall be notified of monitoring devices that become damaged or inoperable within 12 hours of the time Contractor becomes aware of such conditions.
 3. Contractor shall engage qualified technicians with at least four years of previous experience in the installation of the instruments specified herein. Contractor's instrumentation personnel shall include a qualified geotechnical engineer, registered in the State of New Jersey, with at least four years of direct field experience in the installation and monitoring of the types of instruments specified herein to supervise and be responsible for instrumentation installation. Contractor shall provide the Engineer, for his approval, a description of the applicable experience of such personnel. Approval of the personnel shall be received before commencing with the installation. Responsibilities of Contractor's geotechnical engineer shall include, but not be limited to, the following:
 - a. Prepare detailed step-by-step procedures and installation schedule for all instruments specified herein.
 - b. Review and sign all data submittals.
 - c. Be on-site and supervise at least the first two installations of each type of instrument.
 - d. Conduct at least the First two activities of each of the following tasks for each instrument specified herein: pre-installation acceptance tests, post-installation acceptance tests, field calibration, initial reading and data collection, reduction, processing, plotting, and reporting.
 - e. Monitor to the frequency specified herein the control stakes, settlement platforms, and deformation monitoring points. Submit data to the Engineer within 24 hours.
 4. Contractor's instrumentation personnel shall include a person who will be in responsible charge full-time on-site during the installation and initial readings of geotechnical instrumentation program. The superintendent shall have at least four years of direct field experience in installation and monitoring of the types of instrumentation specified herein and shall have supervised instrumentation programs of similar magnitude in similar subsurface conditions. The superintendent shall be on-site and supervise all instrument installations, pre-installation acceptance tests, post-installation acceptance tests, field calibrations, initial readings and data collection, reduction, processing, plotting) and reporting after the geotechnical instrumentation engineer has performed the first two of these tasks as specified herein above.
 5. The person in responsible charge of the surveyors shall be a qualified land surveyor registered in the State of New Jersey with a minimum of four years of experience in deformation measurements of the types and accuracies specified herein. The field survey party chief shall have a minimum of one year of experience in deformation survey measurements of the types and accuracies specified herein.
 6. The driller responsible for drilling instrumentation boreholes shall be on-site full-time during the drilling program and shall have at least four years of direct field experience in drilling boreholes for the types of instruments specified herein.
 7. Contractor's instrumentation personnel and surveyors, including the geotechnical instrumentation engineer, the superintendent, the driller, the field survey party chief, and all other field and office personnel shall be subject to the approval of the Engineer.
- D. A factory calibration shall be conducted on all instruments at the manufacturer's facility before shipment. Each factory calibration shall include a calibration curve with data points clearly indicated, and a tabulation of the data.
- Each instrument shall be marked with a unique identification number.
1. Factory calibrations of vibrating wire piezometers shall be made against a pressure gage traceable to the National Institute of Standards and Technology. The accuracy of the pressure gage shall not be less than twice the specified accuracy of the piezometers. Calibrations shall be made to full scale in two complete cycles, recording the reading in 10 equal increments during two loading and unloading cycles. The thermal factor of each piezometer shall be determined in a precision test chamber, at 32, 50, 68, and 86 degrees Fahrenheit. The calibration record shall include gage factor, thermal factor, and zero reading with corresponding temperature and barometric pressure.
 2. Factory calibration of seismograph vibration monitors shall be performed using a shake table and a reference sensor traceable to the National Institute of Standard and Technology.

203.20 Submittals.

- A. No instrumentation shall be delivered or installed on the site before review by the Engineer of the materials, products, and installation procedures. At least 30 calendar days before proceeding with the work, Contractor shall submit to the Engineer for review the following:
1. Schedule and Procedures: Proposed schedule and procedures for instrumentation installation and performance of initial reading monitoring for the instruments. Detailed step-by-step procedure for installation, together with a sample installation record sheet. The procedures shall be bound and indexed. The installation procedures shall include, but not limited to:
 - a. The method to be used for cleaning the inside of casing.
 - b. Drill casing type and size.
 - c. Depth increments for backfilling boreholes with sand and bentonite pellets.
 - d. Method for overcoming buoyancy of instrumentation components during grouting.
 - e. Method for sealing of joints in pipes and inclinometer casing to prevent ingress of grout.
 - f. Detailed step-by-step procedures for conducting all optical survey measurements to obtain initial readings to the specified accuracy's, including types of surveying equipment all as specified herein.
 - g. Method and equipment for mixing and placing the grout.
 - h. Detailed step-by-step procedures for installation of eight (2) vibrating wire piezometers, at locations designated by the Engineer.
 - i. Format for submitting the survey data for the control stakes, settlement platforms, and deformation monitoring points. The format is subject to Engineer's approval.
 2. Product Data: Manufacturer's catalog cuts, shop drawings, material specifications, installation and maintenance instructions, and other data pertinent to the work of this Section.
 3. Within two workdays of receipt of each instrument at the site. Contractor shall submit to the Engineer, copy of factory calibration, manufacturer's test equipment certification, completed copy of quality assurance checklist, and warranty for each portable readout unit furnished for the Engineer's monitoring program.
 4. Grout Mix: Material specifications and mix design for grout required for piezometer installations along with verification from a certified testing laboratory that this mix is in accordance with the requirements specified. The information shall include specifications for proposed grout mixes, including commercial names, proportions of admixtures and water, mixing sequence, mixing methods and duration, pumping methods and tremie pipe type, size and quantity.
 5. Certifications: Manufacturer's certifications in accordance with Subsection 106.04 that products, materials, and equipment furnished meet the specified requirements.
 6. Qualifications: Documentation that supervisory personnel and technicians performing the instrumentation work are qualified.
- B. Working Drawings:
1. Survey Control Layout: Show survey bench marks and baselines. Show proposed location of deep benchmarks to permit surveying with sight distances less than 200 feet.
 2. Instrumentation Layout and Installation Details: Within two days of installing each instrument, Contractor shall submit and installation record sheet including appropriate items from the following list.
 - a. Project name.
 - b. Contract name and number.
 - c. Instrument type and number including readout unit.
 - d. Planned location in horizontal position and elevation.
 - e. Planned orientation.
 - f. Planned lengths and volumes of backfill.
 - g. Personnel responsible for installation.
 - h. Plant and equipment used including diameter and depth of any drill casing or augers used.
 - i. Date and time of start and completion.
 - j. Spaces on record sheet for necessary measurements or readings required at hold-points during installation to ensure that all previous steps have been followed correctly including instrument readings made during installation.

- k. A log of subsurface data indicating the elevations of strata changes encountered in the borehole. Soil strata nomenclature shall conform to ASTM D 2487.
 - l. Type of backfill used to fill instrumentation boreholes.
 - m. As-built location in horizontal position, top elevation, and bottom elevation.
 - n. As-built orientation.
 - o. As-built lengths and volumes of various backfill materials placed in the instrumentation borehole.
 - p. Result of post-installation acceptance test.
 - q. Weather conditions at the time of installation.
 - r. Notes of importance on the installation including problems encountered, delays, unusual features of the installation, and details of any events that may have a bearing on instrument behavior.
3. An instrument that fails the specified post-installation acceptance test shall be replaced by an identical instrument at no additional cost to the State.

203.21 Job Conditions.

- A. Protection: Protect from damage due to construction operations, weather, traffic, and vandalism, survey reference and control points, instruments and appurtenant fixtures, instrument leads, connections, and other components of the instrumentation systems. Replace any monitoring probes, cables, or readout units that may be damaged or, in the opinion of the Engineer, are not functioning properly or consistently.
- B. Scheduling: Except where otherwise specified, maintain access to instruments. Temporary stoppage or interruption of certain portions of the work may be required to enable the Engineer to monitor and take readings. The Engineer will perform such monitoring and measurement in a manner not to delay the work unnecessarily. Contractor's schedule shall include time for such monitoring and measuring.
- C. Contractor shall provide 6 foot by 6 foot minimum level area around the instrument for the Department's personnel to operate from while monitoring instruments.
- D. When in the Engineer's judgment, the instrumentation data indicate potentially damaging ground displacements, Contractor shall modify the construction rate and sequence as directed by the Engineer, at no additional cost to the State, and take other action as approved by the Engineer to reduce further ground displacements to a rate acceptable to the Engineer.

203.22 Materials.

GENERAL:

- A. Contractor shall provide products, materials, and equipment in conformance with the Plans and Special Provisions so as to fulfill the requirements of the instrumentation work.
- B. Whenever any product is specified by brand name and model number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the product desired. The term "or approved equal" shall be understood to indicate that the "approved equal" product is the same or better than the product named in the Specifications in function, performance, reliability, quality, and general configuration. This procedure is not to be construed as eliminating from competition other suitable products of equal quality by other manufacturers. In such cases Contractor may submit complete comparative data to the Engineer for consideration of another product. Substitute products shall not be ordered, delivered to the site, or used in the work unless accepted in writing by the Engineer. The Engineer will be the sole judge of the suitability and equivalency of the substituted product.
- C. Any request from Contractor for consideration of a substitution shall clearly state the nature of the deviation from the product specified.
- D. For each instrument type, provide an instruction manual which shall include the following:
 - 1. A description of the purpose of the instrument.
 - 2. Theory of operation.
 - 3. Step-by-step procedures for:
 - a. Pre-installation acceptance test when instruments are received on site, to ensure the instruments are functioning correctly before installation.
 - b. Calibration of readout units.
 - 4. A list of calibration equipment required, and recommended frequency of calibration.
 - 5. Step-by-step instrument installation procedure including materials, tools, spare parts and any borehole requirements, and post-installation acceptance tests.

6. Maintenance procedure.
 7. Step-by-step data collection procedure.
 8. Data reduction, processing, and plotting procedures.
- E. All graduations shall be in ENGLISH Units
1. SETTLEMENT PLATFORMS
 - a. Casing and inner pipe shall be steel pipe conforming to the requirements of ASTM A53, welded, standard weight.
 - b. Base plate shall be HDO plywood.
 - c. Sand base and sand fill shall be Zone 1 material conforming to the provisions of Subsection 203.03
 3. VIBRATING WIRE PIEZOMETERS
 - a. Vibrating Wire Pressure Transducer: Vibrating wire transducers shall be Model No. 4500S as manufactured by Geokon, Inc., or approved equal. The vibrating wire piezometers shall have a pressure range of 100 psi. Piezometers shall have an over-range rating of twice the rated pressure, plus or minus 0.2 percent full scale accuracy, 0.025 percent full scale resolution, and be fitted with a low air entry filter.
 - b. Electric Cable and Splice Kit: Electrical cable for individual piezometers shall be Model 02-250V6 manufactured by GeoKon, Inc., or approved equal. Each cable shall be attached to the appropriate piezometer and permanently marked with the number of the instrument to which it is attached. Cable shall be attached to the piezometer through an integral bull head seal and a cable entry seal. Seals shall be either o-rings or hermetic seals. The seals shall have been tested and certified for water-tightness over the specified pressure range of the piezometers. Splice kits for splicing cables shall be Model SUP-820 as manufactured by Geokon, Inc, or approved equal.
 - c. Protective conduit: Conduit for protection of buried electrical cables shall be 4 inch diameter corrugated polyethylene pipe, Model ADS N-12, as manufactured by Advance Drainage Systems, Inc. or approved equal.
 - d. Readout unit: Vibrating wire readout unit shall be Model No. GK-403 as manufactured by Geokon, Inc., or approved equal.
 - e. Special Sealing Grout: Portland cement, bentonite, and water as specified in Subsection 5.
 - f. Readout Station: Each readout station shall consist of a lockable readout terminal box raised above ground on a pedestal, pole or other suitable rigid support. The readout terminal box shall be aluminum or other approved non-corroding material and shall contain a switch type panel for selecting the output of up to four vibrating wire piezometers plus one "dummy" piezometer. A surge protector board shall be provided for each vibrating wire piezometer and shall be installed in the terminal box. Instrument identification labels shall be placed on the panel at locations such that when the switch is pointing to the label, it corresponds directly to the piezometer being read. Terminal boxes shall have sufficient opening at the bottom to allow for entry of all instrument cables and ground wire. The latter shall be attached to the top of a 3m long 14 millimeter diameter copper clad ground installation rod installed near the base support for the terminal box.
 - g. Terminal Box: The readout terminal box shall be manufactured by Geokon, Inc, or approved equal.
 - h. Surge protector: The surge protector board shall be Model No. 4999-12L, as manufactured by Geokon, Inc., or approved equal.
 - i. Filter Sand: Filter sand shall be Standard Ottawa sand, or approved equal.
 - j. Bentonite Pellet Seal: Use pelletized bentonite with an approved water-soluble coating for forming a seal above the piezometer filter sand and canvas bag. Size pellets to permit placing without difficulty at the desired elevation before their hydration. The Contractor shall demonstrate that the Bentonite pellets are compatible with the insitu groundwater for hydrating, and shall be subject to approval by the Engineer.
 - k. Cylindrical Sounding Hammer: The cylindrical sounding hammer for use above the piezometer shall be a steel cylinder with outside diameter of 0.31 to 0.47 inches less than the inside diameter of the casing, an inside diameter of 0.15 to 0.28 inches larger than the outside diameter of the cable, a length of not less than 24 inches, and a weight of 11 to 22 pounds.
 4. CEMENTITIOUS MATERIALS
 - a. Special Grout Mix: The special grout required for installation of instrumentation shall be a cement-bentonite material that is non-shrink and non-metallic. The special grout shall not contain

calcium chloride or other salts, or aluminum or other harmful metals. When tested in accordance with ASTM C827, the material shall show no shrinkage in the plastic state, and in accordance with ASTM C109 shall show a seven-day strength of no less than 3.5 psi and a 28 day strength of between 4.75 and 6.5 psi as measured on 2 inch cubes.

- b. Water: Water shall conform to ACI 301, Chapter 2, Paragraph 2.3.
- c. Lean Concrete: The concrete required for installation of protective terminal boxes shall have a minimum compressive strength of 3 psi.

5. CONTROL STAKES

- a. The vertical post of the control stake shall be sound untreated Number 2 southern pine, and shall be painted at the bottom. The horizontal and vertical cross members shall be sound untreated Number 2 southern pine, dressed at least on one face. The dressed face shall be painted white. The face painted white shall also have black markings. The members shall be spiked together.
- b. All paint shall be of a weatherproof exterior grade and shall conform to the requirements of NJDOT Standard Specifications Section 912.

203.23 Construction Requirements.

A. Pre-installation Acceptance Tests

- 1. When instruments are received at the site. Contractor's instrumentation personnel shall perform pre-installation acceptance tests to ensure that the instruments and readout units are functioning correctly before installation.

Pre-installation acceptance tests shall include relevant items from the following list.

- a. Examine factory calibration curve and tabulated data to verify completeness.
- b. Examine manufacturer's final quality assurance inspection checklist to verify completeness.
- c. Check cable length.
- d. Check tag numbers on instrument and cable.
- e. By comparing with procurement document, check that the model, dimensions, materials, etc. are correct.
- f. At point of connection to instrument bend cable back and forth while reading the instrument to verify connection integrity.
- g. Perform resistance and insulation testing in accordance with criteria provided by the instrument manufacturer using a gauge insulation or circuit tester that applies two volts or less for resistance testing and two volts or less for insulation testing.
- h. Verify that all components fit together in the correct configuration.
- i. Check all components for signs of damage in transit.
- j. Check that quantities received correspond to quantities ordered.
- 2. During pre-installation acceptance testing of each instrument Contractor's instrumentation personnel shall complete a pre-installation acceptance test record form. Sample test record forms for selected instruments will be provided by the Engineer to Contractor on request. Test forms for other instruments shall include equivalent content.
- 3. An instrument that fails the specified pre-installation acceptance test shall be repaired such that it passes a subsequent pre-installation acceptance test or shall be replaced by an identical instrument at no additional cost to the Department.

B. General

- 1. All instrumentation shall be installed and furnished in accordance with the details shown on the Plans and requirements of the Specifications at the locations shown on the drawings or as directed by the Engineer.
- 2. Instrumentation shall include maintaining instrumentation throughout the Contract. This shall include, but shall not be limited to the raising and lowering of settlement platform risers as required to enable access to and measurement of monitoring instruments from the top of the fill. Locations where instrumentation and settlement plate risers and coiled tubes protrude through the fill or extend out beyond the toe of the fill shall be barricaded and clearly flagged with a color flag. Barricading shall consist of 20 inch by 1 (X) inch wood risers and horizontals, or other methods approved by the Engineer. The barricades shall be placed at least 2 feet from the risers and tubes.
- 3. Damaged instrumentation shall be repaired or replaced at the expense of Contractor. The repair or replacement shall occur within one week of notification of damage by the Engineer, unless otherwise specified.

4. Specimens of grout shall be obtained from each batch of grout mix prepared for instrument installation for testing by a certified laboratory to verify that the 28 day compressive strength of the batch is as specified.
Specimens shall either be 2 inch cubes or cylindrical specimens with a diameter of 3 inches and a length of 6 inches, or as approved by the Engineer. One specimen shall be taken immediately before initial placement of each batch of grout in the ground (the "initial" specimen) and another specimen (the "final" specimen) shall be recovered after at least two-thirds of the batch has been placed or at the completion of grouting if less than two-thirds of the batch has been used. The Engineer may order additional ("intermediate") specimens be prepared following delays or stoppage of the work or at other times as deemed necessary. Each specimen shall be labeled with the time and date at which it was prepared and whether it is an initial, final, or intermediate specimen.
5. Installation procedures for instruments in boreholes shall be such that all steps in the procedure can be quality assured. Volumes of each increment of backfilling with sand and bentonite shall be small enough such that no bridging occurs, and the depth to the top of each increment shall be checked after placement.
6. Specifications and Plans refer to depth of boreholes into dense sand or bedrock and deep benchmarks. Minimum depths are specified and estimated bottom elevations are shown on the Plans. Boreholes shall be drilled to the specified minimum depths into dense sand or bedrock, or to the specified bottom elevations, whichever are deeper.
7. The Contractor shall notify the Engineer at least 24 hours prior to installing each instrument.
8. An instrument that fails the specified post-installation acceptance test shall be replaced by an identical instrument at no additional cost to the State.
9. Whenever withdrawing drill casing during instrument installation in a borehole, care should be taken to minimize the length of unsupported borehole and the rate of drill casing withdrawal. Collapse of the borehole shall not be allowed to occur. Backfill material shall not be allowed to build up inside the drill casing such that the instrument is lifted as the casing is withdrawn. The drill casing shall be withdrawn without rotation.

C. Settlement Platforms

1. Settlement platforms shall be constructed and installed as shown on the Plans before placement of Zone 1 blanket fill material. Settlement platforms shall consist of square platforms installed on a sand base on the original ground surface with a vertical pipe marked to indicated distances above the plate, extending up through the overload fill. They shall be fabricated according to the details shown on the Plans.
2. The settlement plate shall be placed on sand base. The sand base shall be tamped to provide a firm, unyielding and level bearing surface for the base plate. The original ground surface must be stripped of all vegetation to provide a level base of sand for the settlement plate. The vertical pipes shall have a maximum length of 4 feet for each section. Spacers shall be provided between the riser pipe and casing pipes at intervals of 4 feet maximum to ensure concentricity. A container or protective casing with both ends open shall be placed around the initial length of casing pipe. This container shall be backfilled with tamped clean sand or gravel to support the pipe in a vertical position during fill placement until the fill is carried above the platform.
3. As the height of fill above the settlement plate changes, the casing and settlement measuring pipes shall be increased or decreased in a maximum of 4 feet increments to maintain the top of the pipe and casing above the embankment. As each additional length of pipe is added or removed, the pipe cap on the casing shall be immediately transferred to the top section on the settlement plate to prevent fill material from entering the casing.
4. The casing pipe shall be marked by flags to clearly show its location and to warn equipment operators and others of its location. Contractor shall maintain the flags during the Contract, and replace those that are missing.
5. Contractor is responsible for maintaining the settlement platforms in working order during the Contract. Settlement platforms damaged by Contractor's construction operation shall be repaired or replaced by Contractor, at Contractor's expense, within three calendar days after being damaged.
6. Contractor shall request a joint initial survey from the Engineer upon the completion of the installation of the settlement platforms. The Engineer shall be given a minimum two working days notice before survey services are required.

7. The Contractor will survey the position and elevation of the settlement plate risers at least once per week until one month after completion of placement of the embankment fill and overload and then once every two weeks until the overload fill is removed. Results shall be reported to the Engineer within 24 hours of the survey.
 8. The settlement plate risers shall at no time rise above 5 feet over the surrounding ground surface elevation. Sections shall be added or removed as necessary during filling or removal of fill to maintain the tops of the pipes at least 12 inches above the surface of the fill.
 9. The settlement plate risers shall be surveyed by the Contractor immediately before and after additional extensions are added or removed. Contractor shall notify the Engineer at least two working days before extension or removal of the settlement plate risers.
- D. Vibrating Wire Piezometers
1. Contractor shall furnish and install vibrating wire piezometers as specified herein and as shown on the Plans. The piezometers shall be installed at the locations and sensor elevations indicated on the Plans. The piezometers shall be installed, and piezometer readings shall stabilize, before excavation or surcharge fill placement. The Engineer reserves the right to modify the locations, number, and sensor elevations based on the materials encountered in the boreholes during installation. The piezometer sensor shall be located within the compressible stratum, as determined by the Engineer.
 2. At six (2) piezometer locations, designated by the Engineer, special installation methods will be required for a comparison study of the effectiveness of vertical granular drains and wick drains. At these locations accurate measurements of the vertical alignment of the completed piezometer will be required. The alignment of the piezometer and position of the pressure transducer shall be determined, to within 1 inch, using an inclinometer. A temporary steel casing will be required to allow installation of inclinometer casing fitted with centralizing spacers. Other methods of installation may be submitted for review and approval of the Engineer. The goal of the installation procedure is to position the pressure transducer of the piezometer to within 15 inches (± 1 inch) of an adjacent Vertical Granular Drain or Wick Drain, to be installed subsequent to the piezometer. Refer to Specifications for details of requirements of Vertical Granular Drains and Wick Drains. The detailed procedure for this work shall be submitted to the Engineer for review and approval.
 3. The piezometer shall be installed within a cased borehole having a minimum diameter as shown on the Plans. The borehole shall be advanced using rotary drilling methods with temporary casing and using water as the drilling fluid. The use of drilling mud will not be permitted. The casing shall be installed to a minimum depth of 12 inches below the sensor elevation shown on the Plans or as directed by the Engineer. When the drilling is completed, the borehole shall be flushed with clean water to remove all drilling fluid and cuttings.
 4. Two split-spoon soil samples shall be taken, one at the bottom of the borehole, and one 5 feet above the piezometer elevation and submitted to the Engineer before installation of the instrument to confirm that the sensor will be installed within the compressible soil stratum. Three split spoon samples shall be taken of the material assumed to provide base fixity, one at the bottom of the borehole, others at 5 feet and 10 feet above the bottom of the borehole and submitted to the Engineer before installation of the instrument.
 5. Before placing the piezometers in the hole, the casing shall be raised 12 inches and a 12 inch layer of filter sand shall be placed in the bottom of the hole. Provide a measuring device approved by the Engineer to check that the required filter sand level is achieved.
 6. Take zero pressure transducer and temperature sensor readings in a controlled temperature environment prior to taking instrument into the field. Once in field, allow calibration instrument to thermally stabilize for at least 10 minutes prior to taking reading. Take barometric pressure reading and compare to reading of piezometer when held in air. Record all readings.
 7. Saturate the stainless steel filter of the piezometer sensor with clean water.
 8. Lower the piezometer sensor and cable assembly to top of filter sand in the borehole. After insertion of the piezometer, a check shall be made to ensure that the piezometer reading agrees with the water head, and the elevation of the diaphragm shall be recorded.
 9. Fill the borehole with filter sand to 12 inches above the top of the sensor. Measure the depth to the top of the sand in the borehole for verification. The casing shall be raised to a level of 12 inches above the final elevation of the top of the piezometer sensor. Piezometers shall be saturated before placement in the hole and saturation shall be maintained throughout installation. Fill the annulus between the piezometer assembly and the wall of the hole with filter sand to a height of 12 inches above the top of

the piezometer sensor. Withdraw the casing in small increments as to prevent caving of the unsupported borehole sections and place bentonite pellets in the annulus and tamp in place with the cylindrical sounding hammer to produce a bentonite seal a minimum of 3 feet thick above the top of the filter sand. The pellets shall be placed in layers, taking care not to form a plug within the casing bottom. The length of the seal shall be checked with a cylindrical sounding hammer. The remainder of the hole shall then be filled with special grout specified, and casing withdrawn from the hole. Samples of grout shall be recovered for testing as specified.

10. Record the volume of grout and take initial piezometer readings following installation.
 11. Take and record subsequent piezometer readings following installation until readings stabilized.
 12. Cables from the piezometers shall be routed to the toe of the embankment or outside the limits of retained fill, or as directed by the Engineer. The cables shall be protected from damage by placing in conduit installed in trenches. The trench shall be at least 20 inches in width and shall be excavated to a minimum depth of 20 inches. Upon completion of the trench, the conduit shall be placed on the bottom of the trench, taking care to remove any sharp objects or stones larger than 4 inches. The trench shall not be backfilled until the cable has been installed in the conduit and the Engineer has verified that the instrument is functioning properly.
 13. The cable shall be installed in the conduits leaving at least 16 feet of slack within the conduit to prevent the cable from tensioning as a result of settlement.
 14. After the cable has been installed in the conduit and the Engineer has verified that the instrument is functioning properly, the trench shall be backfilled using the excavated material. The surface should be tamped using the bucket of the backhoe.
 15. A readout station consisting of a terminal box supported a minimum of 3 feet above grade, shall be provided at the location of each vibrating wire piezometer array. The station shall be located so as not to interfere with construction activities.
 16. The ends of the piezometer cables shall be routed into the terminal box and attached as per the manufacturer's recommendations. Grounding shall be provided by installing a grounding rod into the ground next to the readout station, and connecting to the rod with a grounding wire.
 17. The support for the terminal box shall be rigid. Both the exterior of the terminal box and the support shall be painted orange.
 18. Labeling of cables shall be performed for vibrating wire piezometers. Instrument designation number shall appear on each instrument sensor and at the manual readout terminal to which each cable is connected.
 19. After completion of installation a post-installation acceptance test shall be performed to verify that the piezometer functions correctly.
 20. The Engineer and Contractor shall take the initial joint vibrating wire piezometers readings immediately after the vibrating wire piezometers is installed and before any fill is placed. The Engineer will take readings at least once a week thereafter for the duration of the Contract. Contractor shall cooperate as necessary in order that the subject operations can be performed.
 21. Contractor is responsible for maintaining the piezometers in working order during the Contract. Piezometers damaged by Contractor's construction operation shall be repaired or replaced by Contractor within seven days at Contractor's expense, to the satisfaction of the Engineer.
- E. Control Stakes
1. Fill control stakes shall be furnished and installed as specified herein and as shown on the Plans. Fill control stakes shall be located as shown on the Plans or as ordered by the Engineer before placement of the fill.
 2. Contractor shall maintain and keep in good order fill control stakes and shall take whatever precautions are necessary to prevent any alterations, movement, or disturbance of them. Control stakes shall be reset or replaced by Contractor at Contractor's expense when and as directed by the Engineer. If in the opinion of the Engineer, damage has been done to any fill control stake to impair its effectiveness as a control, Contractor shall stop work at and near its location until the stake is reset or replaced, to the satisfaction of the Engineer. Toe stakes shall be resurveyed upon reinstallation at the expense of Contractor.
 3. Each line of stakes shall be installed along a survey line established by two reference points. The exact location of each line of stakes will be determined by the Engineer and Contractor together to use the most convenient reference points. The reference points shall be located at least 300 feet from the Project limits so that they are not in an area where their position can be influenced or affected by the

- embankment being constructed. The reference points for each line may be composed of existing permanent monuments or reference points. Where these are not available, reference points shall be installed by Contractor, as directed by the Engineer. The stakes shall be installed such that the center of each stake is not more than 0.11 inches either side of the line established by the two reference points. Contractor shall notify the Engineer when each line has been installed and ready for measurements. The Engineer will check the alignment before approval and acceptance.
4. The embankment control stakes shall be installed before any placement of adjacent fill. Contractor and Engineer shall take joint initial readings. The Contractor will survey the position and elevation of the control stakes at least once per week until one month after completion of placement of the embankment fill and overload and then once every two weeks until the surcharge fill is removed.
- F. Tolerances
1. Establish the elevation of benchmarks to 0.04 inches.
 2. Establish the initial elevation of settlement platforms and piezometers to 0.11 inches.
 3. Establish the initial coordinates of each instrument installation to 1.2 inches.
 4. Establish the initial position of control stake points to 0.11 inches.
- G. Survey Control
1. Before start of construction, establish bench marks for use by monitoring instruments using bench marks, supplied by the Department, and deep benchmarks installed as part of this Contract to the tolerances specified herein.
 2. Establish the elevation of bench marks by running level circuits started and closed at the specified existing benchmarks.
 - a. Establish turning points during leveling so that foresight and back-sight distances are approximately equal.
 - b. Use well-defined surface points of solid objects or masonry nails driven into pavement for turning points.
 - c. Do not exceed sight distances of 200 feet.
 - d. Establish an error of closure less than 0.11 inches for level circuit closures. If an error of closure greater than 0.11 inches is achieved for any level circuit, resurvey the circuit.
 - e. Prove the established elevations of benchmarks by obtaining consistent results on at least three separate and complete level circuits. If an inconsistent elevation for any bench mark results, resurvey the level circuit until correct and repeatable elevations are obtained.
 3. Check elevation of bench marks every month or when directed by the Engineer.
- H. Protection and Maintenance
1. Protect and maintain instrument systems throughout the entire Contract. Maintenance shall include draining or flushing protective terminal boxes, repairs to damaged or missing components of systems, and raising and lowering instrumentation, as required, during general excavation and fill placement and removal. Damaged or missing instrumentation shall be repaired or replaced by Contractor within seven days, unless otherwise specified at no expense to the State.
 2. Contractor shall furnish and install protective terminal boxes as specified and as shown on the Plans. The terminal boxes shall be installed at the locations indicated on the Plans. The terminal boxes shall be installed outside and concentrically with the instrument casings and as approved by the Engineer. The terminal boxes shall extend to a maximum of 4 feet above the final grade and shall penetrate at least 24 inches below the final grade and as approved by the Engineer. Ensure an intimate soil/terminal box and terminal box/instrument casing contact using lean concrete as specified.
- I. Disposition of Instruments.
1. All readout units, sensors, accessories, and instruments shall become the property of the State and shall be forwarded to the Geotechnical Engineering Unit of NJDOT when no longer required.
 2. All instruments shall remain in place except those that may be removed or abandoned, as directed by the Engineer because of interference with the roadway construction. When directed by the Engineer, safe keep of those portions of all instruments, including terminal boxes and covers, that are readily accessible. Grout all remaining open portions of the boreholes, backfill the area, patch pavement of surface, and restore to the Engineer's satisfaction. Grout shall be cement grout consisting of Type III Portland cement and water. No instrumentation shall be demolished, abandoned, removed, or disposed of without prior approval of the Engineer.
 3. All surfaces affected by installation of instruments shall be restored to the original condition prior to completion of the work.

J. Implementation of Plans of Action

1. The Engineer shall interpret the data collected, which shall include making correlations between instrumentation data and specific construction activities. For specific instrumentation used for the protection of the existing bridge abutments and piers and slope stability, the instrumentation data shall be evaluated to determine whether the response to construction activities is reasonable.
2. If the Threshold Value is reached the Contractor shall:
 - a. Meet with Engineer to discuss appropriate response action(s) required, if any, so that the Limiting Value is not exceeded.
 - b. If directed by the Engineer, implement the reviewed plan of action within 24 hours so that the Limiting Value is not exceeded.
 - c. Install additional instrumentation, as directed by the Engineer.
3. The Contractor shall take all necessary steps so that the Limiting Value is not exceeded. Contractor may be directed to suspend activities in the affected area with the exception of those actions necessary to avoid exceeding the Limiting Value.

203.24 Method of Measurement.

- A. The following items of work will be measured as a unit complete in place or as furnished in compliance with the Plans and Specifications.
 1. Settlement Platforms.
 2. Vibrating Wire Piezometer Readout Units.
- B. Separate measurement for the monitoring requirements of the settlement platforms, control stakes, and deformation monitoring points, including assistance to the Engineer in monitoring instruments, will not be made.
- C. Drilling of holes, temporary casing, terminal boxes and covers, and incidental items necessary for installation of the instruments and removal of instruments no longer required including filling of holes with grout, will not be measured separately for payment, but all costs therefore, will be considered incidental to these items of work.

203.25 Basis of Payment.

Payment for the items specified above will be made at the Contract prices for the quantities as determined above, which prices shall include the cost of furnishing all labor, materials, equipment, and incidentals necessary to satisfactorily fabricate, calibrate, test, furnish, install, protect, and maintain, and monitor the instrumentation and to remove instruments no longer required as shown on the Plans and specified herein, including labor for assistance to the Engineer in monitoring instruments.

Payment will be made under:

<i>Pay Item</i>	<i>Pay Unit</i>
SETTLEMENT PLATFORMS, NS	UNIT
VIBRATING WIRE PIEZOMETER READOUT UNITS	UNIT

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 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 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

River Jacks will be 3-5" river cobbles usually dredged from the Delaware River Bottom. These cobbles should not pass a #3 sieve but be able to pass a #6 sieve. A sample will be provided for approval.

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.

207.08 Method of Measurement.

THE FOLLOWING WAS ADDED:

River Jacks will be measured in cubic feet. Aluminum Edging will be measured in linear foot.

207.09 Basis of Payment

THE FOLLOWING WAS ADDED:

RIVER JACKS

CUBIC FOOT

SECTION 212 – SOIL EROSION AND SEDIMENT CONTROL

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 single sheet of a minimum of 10-mil polyethylene sheeting and bermed to prevent escape of discharge. Submit a plan for concrete washout facility for approval to RE 10 days before 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 waterbodies, wetlands, or other areas indicated on the plans. Use signs to designate concrete washout areas. Ensure that the facility complies with Federal, State, and local laws, rules, and regulations. 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. Contractor to provide at least two (2) concrete washout facilities for the project.

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.

- L. Spill Kit.** Each kit is to contain the following:
- 10 - 5inch by 10 foot Oil-Only Absorbent Booms
 - 10 - 3inch by 10 foot Oil-Only Absorbent Booms
 - 60 - 20 inch by 16 inch Oil-Only Absorbent Pads
 - 20 - Temporary Disposal Bags and ties
 - 1 - Emergency Response Guide Book
 - 1 - Instruction Manual
 - 1 - Wheeled Container for the above

Note: Each Spill Kit has a 50-gallon absorption capacity.
Replace each piece as used.

212.09 Method of Measurement

THE FOLLOWING IS ADDED

Concrete Washout Facility will not be measured, and payment will be made on a lump sum basis. Spill Kits shall be measured by the Unit.

212.10 Basis of Payment

THE FOLLOWING IS ADDED

<i>Pay Item</i>	<i>Pay Unit</i>
CONCRETE WASHOUT FACILITY	LUMP SUM
SPILL KIT	UNIT

THE FOLLOWING IS ADDED:

INLET FILTERS, SILT SACK TYPE

Description

This work shall consist of furnishing, installing, maintaining, and removing Siltsack sediment control device as directed by the engineer or as shown on the contract drawings. Siltsack sediment control device is manufactured by:

ACF Environmental, Inc.
2831 Caldwell Drive
Richmond, Virginia 23234
Phone: 800-448-3636
Fax: 804-743-7779
www.acfenvironmental.com

or
East Tennessee Geosynthetics
P.O. Box 12440
Knoxville, TN 37912
Phone: 865-938-7157
Fax: 865-938-8455
www.etgeo.com

or other equal

Materials

Siltsack shall be manufactured from a specially designed woven polypropylene geotextile manufactured by SI Geosolutions and sewn by a double needle machine, using a high strength nylon thread.

Siltsack will be manufactured to fit the opening of the catch basin or drop inlet. Siltsack will have the following features: two dump straps attached at the bottom to facilitate the emptying of Siltsack; Siltsack shall have lifting loops as an integral part of the system to be used to lift Siltsack from the basin; Siltsack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this yellow cord is also visual means of indicating when the sack should be emptied. Once strap is covered with sediment, Siltsack should be emptied, cleaned, and placed back in the basin.

Siltsack seams shall have a certified average wide width strength per ASTM D-4884 standards as follows:

SILTSACK Style	Test Method	Test Results
Regular Flow	ASTM D-4884	165.0 lbs./in
Hi-Flow	ASTM D-4884	114.6 lbs./in

SILTSACK Regular Flow

Property	Test Method	Units	Test Results
Grab Tensile	ASTM D-4632	lbs.	315x300
Grab Elongation	ASTM D-4632	%	15x15
Puncture	ASTM D-4833	lbs.	125
Mullen Burst	ASTM D-3786	P.S.I.	650
Trapezoid Tear	ASTM D-4533	lbs.	120x150
UV Resistance	ASTM D-4355	%	90
Apparent Opening	ASTM D-4751	US Sieve	40
Flow Rate	ASTM D-4491	Gal/Min/Ft ²	40
Permittivity	ASTM D-4491	sec ⁻¹	0.55

Or SILTSACK High-Flow

Property	Test Method	Unit	Test Results
Grab Tensile	ASTM D-4632	lbs.	255x275
Grab Elongation	ASTM D-4632	%	20x15
Puncture	ASTM D-4833	lbs.	135
Mullen Burst	ASTM D-3786	P.S.I.	420
Trapezoid Tear	ASTM D-4533	lbs.	40x50
UV Resistance	ASTM D-4355	%	90
Apparent Opening	ASTM D-4751	US Sieve	20
Flow Rate	ASTM D-4491	gal/min/ft ²	200
Permittivity	ASTM D-4491	sec ⁻¹	1.5

Construction Sequence

To install Siltsack in the catch basin, remove the grate and place the sack in the opening. Hold out approximately six inches of the sack outside the frame. This is the area of the lifting straps. Replace the grate to hold the sack in place.

When the restraint cord is no longer visible, Siltsack is full and should be emptied.

To remove Siltsack, take two pieces of 1" diameter rebar and place through the lifting loops on each side of the sack to facilitate the lifting Siltsack.

To empty Siltsack, place it where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the sack) and lift. This will turn Siltsack inside out and empty the contents. Clean out and rinse. Return Siltsack to its original shape and place back in the basin.

Siltsack is reusable. Once the construction cycle is complete, remove Siltsack from the basin and clean. Siltsack should be stored out of the sunlight until needed on another project.

Basis of Payment

Payment for all Siltsack used during the construction is to be included in the bid price for the overall erosion and sediment control plan unless unit price is requested. Maintenance of Siltsack also to be included in this price.

Payment will be made under:

Pay Item

INLET FILTER, SILTSACK TYPE

Pay Unit

UNIT

THE FOLLOWING IS ADDED:

ORANGE HEAVY DUTY SILT FENCE**Description**

This work shall consist of furnishing, installing, maintaining, and removing silt fence as directed by the engineer or as shown on the contract drawings. Silt fence is manufactured by:

Belton Industries, Inc.

Post Office Box 127

Highway 76 at Hamby Road

Belton, South Carolina, USA 29627

Phone: (864) 338-5711, 1-800-845-8753

Fax: (864) 338-5594

www.beltonindustries.com

or

DGI Industries

1359 Hooksett Rd.

Hooksett, NH 03106-1809

Phone: (603) 641-2850

www.dgiindustries.com

or other equal

Payment will be made under:

Pay Item

ORANGE HEAVY DUTY SILT FENCE

Pay Unit

LINEAR FOOT

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 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 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

3. Waiving Standard Compaction Requirements.

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

The compaction requirements in Subsection 301.05, Subparts 1 and 2, are waived.

SECTION 302 – ROAD-MIXED STABILIZATION

302.09 Compaction, Shaping, and Finishing.

A. Compaction.

THE LAST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

The in-place dry density of each compacted course will be determined according to AASHTO T 310 (Direct Transmission Method) except that only one method will be used throughout the Project.

SECTION 305 – CONCRETE BASE COURSE

305.05 Opening to Traffic.

THIS SUBSECTION IS CHANGED TO:

The opening to traffic shall be as specified in Subsection 405.20.

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 °F 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./yd² 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.

A materials transfer vehicle (MTV) is required for the construction of the pavement surface course in the Traveled Way. The following structure(s) may be traversed by a loaded MTV:

STRUCTURE NO.: NAME:

A materials transfer vehicle (MTV) is required for the construction of the pavement surface course and intermediate course in the Traveled Way. The following structure(s) may be traversed by a loaded MTV:

STRUCTURE NO.: NAME:

A materials transfer vehicle (MTV) is required for the construction of all pavement courses in the Traveled Way. The following structure(s) may be traversed by a loaded MTV:

STRUCTURE NO.: NAME:

A materials transfer vehicle (MTV) is optional for the construction of the pavement. The following structure(s) may be traversed by a loaded MTV:

STRUCTURE NO.: NAME:

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.

404.13 Weather Limitations.

THE LAST SENTENCE OF THIS SECTION 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 $\frac{1}{8}$ 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 $2\frac{1}{4}$ inches. A vertical edge joint will be permitted for lift thickness $2\frac{1}{4}$ inches or less when traffic has to be maintained. For lift thickness greater than $2\frac{1}{4}$ 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 $\frac{1}{4}$ 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 $\frac{1}{8}$ of an inch) than the previously placed adjoining mat. If the newly compacted mat results in a depression at the joint of $\frac{1}{8}$ 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 foot. 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.

404.21 Surface Course Rideability Requirements.

For this Project, the payment reduction provisions for new construction, reconstruction, or dualization projects shall govern at the following locations:

For this Project, the payment reduction provisions for resurfacing or widening projects shall govern at the following locations:

For this Project, the no payment reduction provisions shall govern.

404.25 Method of Measurement.

THE THIRTEENTH PARAGRAPH IS CHANGED TO:

The monthly asphalt price index will be the average of quotations from suppliers serving the area in which the Project is located. The asphalt price index for North and South of Route I-195 will be posted every month on the Department's web site: www.state.nj.us/transportation/eng/CCEPM/PriceIndex.shtm.

THE FOURTEENTH PARAGRAPH IS CHANGED TO:

The basic asphalt price index will be the previous month's asphalt price index before receipt of bids.

THE LAST PARAGRAPH IS DELETED:

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:

<i>Pay Item</i>	<i>Pay Unit</i>
POLYMERIZED JOINT ADHESIVE	LINEAR FOOT

THE FOLLOWING PAY ITEM IS DELETED:

SEALING OF CRACKS AND JOINTS IN HOT MIX ASPHALT SURFACE COURSE	LINEAR FOOT
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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.

THE FOLLOWING IS ADDED TO THIS SECTION:

PAVING SPECIALITIES – IMPRINTED ASPHALT PAVING

Description.

Hot-mix asphalt paving, as specified by Section 02741 Hot-Mix Asphalt Paving.

- A. This work shall consist of the asphalt imprinting surface treatment over asphalt pavement.

Quality Assurance

- B. The contractor performing the imprinting work shall be authorized by the manufacturer, have the appropriate level of training and have sufficient experience to successfully install the surface treatment.

Manufactures

- C. Approved finishing system manufacturer: StreetPrint, 936 Portal Drive, Blaine, WA 98230-4040 (1-866-530-6689). www.streetprint.com

Materials

- D. Imprinting Coatings:
1. StreetBond SP150E: high performance coating material consisting of epoxy based acrylic polymers
 2. StreetBond SP50: a cement modified, acrylic polymer and aggregate blend
- E. Imprinting Patterns and Colors
1. British cobble in gray, concentric pattern.

Installation

- F. Field Conditions
1. The imprinting contractor shall apply the surfacing system only when the air temperature is at least 50°F (10°C) and rising, and will not drop below 50°F within eight (8) hours of application of the coating. There should be no precipitation expected within four (4) hours after applying the topcoat.
- G. Surface Preparation
1. Install hot-mix asphalt paving as specified by Section 02741
 2. After the hot asphalt has been placed and compacted and the asphalt is still in a warm to hot pliable state, proceed immediately with the imprinting process.
 3. If imprinting does not immediately proceed after the hot-mix asphalt installation, the surface must be examined prior to the application of coatings. The asphalt surface shall be free of all dirt, mud, oil or anything that will affect coating bond. If dirt has to be removed, the asphalt surface shall be power washed and allowed to dry completely before proceeding.
 4. If the asphalt is not in the acceptable temperature range, apply heat using reheating equipment such as an infrared or hot air heater. Neither direct flame heaters nor overheating of the asphalt shall be permitted. It is recommended that the temperature of the asphalt surface be regularly monitored during the reheating process to avoid overheating and degradation of the asphalt cement.
- H. Application of Surface Imprinting System
1. Use the same specified color for each coating layer. Patterning shall be of consistent depth.
 2. Apply two coats of SP50 employing the pattern as dimensioned
 3. Apply one coat of SP150E. The ratio of SP50 to SP10E shall be 2:1.
- I. Field Quality Control
1. The contractor shall review the completed installation with Owner's Representative to insure that the installation is in compliance with the ADA (American with Disabilities Act) guidelines. If the difference between the adjacent grade and the imprinted surface is within the 1/4 inch to 1/2 inch range, installing bevel edge treatment may be requested at the Owner's Representative discretion.

Method of Measurement.

Streetprint, Offset Brick, Brick and Streetprint, British Cobble, Granite will be measured by the square foot.

Basis of Payment

Payment will be made under:

Pay Item

STREETPRINT, OFFSET BRICK, BRICK
STREETPRINT, BRITISH COBBLE, GRANITE

Pay Unit

SQUARE FOOT
SQUARE FOOT

DIVISION 500 - BRIDGES AND STRUCTURES

SECTION 501 - CONCRETE STRUCTURES

501.01 Description.

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

This work shall also consist of the construction of portland cement concrete deck slabs, parapets and sidewalks with the use of High Performance Concrete (HPC). Additionally, HPC shall be used for the protection of substructures that may be subjected to waterway abrasion.

THE SECOND THROUGH SIX PARAGRAPHS ARE DELETED.

501.02 Materials.

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPHS MATERIAL LIST

High Performance Concrete..... 914.02

THE FOLLOWING IS ADDED:

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.

THE FOURTH THROUGH SIX PARAGRAPHS ARE DELETED.

501.05 Working Drawings.

THE SECOND, THIRD AND FOURTH PARAGRAPHS ARE DELETED.

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 21ST 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, 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.

17. Reinforced Concrete Box Culvert, Precast.

THIS SUBPART IS DELETED

18. Slip-form Method of Parapet Construction.

THIS SUBPART NUMBER IS CHANGED TO:

17. Slip-form Method of Parapet Construction.

19. Corrosion Inhibitor Admixture.

THIS SUBPART NUMBER IS CHANGED TO:

18. Corrosion Inhibitor Admixture.

PARAGRAPH C IS DELETED

20. Pressure Injection.

THIS SUBPART NUMBER IS CHANGED TO:

19. Pressure Injection.

THE FOLLOWING SUBPART IS ADDED:

- 20. 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.

501.25 Method of Measurement.

THE 8TH PARAGRAPH IS DELETED.

501.26 Basis of Payment.

THE 18TH PAY ITEM IS CHANGED TO:

<i>Pay Item</i>	<i>Pay Unit</i>
SAWCUT GROOVED DECK SURFACE	SQUARE FOOT

THE FOLLOWING PAY ITEMS ARE ADDED:

CONCRETE IN SUPERSTRUCTURE, DECK SLABS HPC	CUBIC YARD
CONCRETE IN SUPERSTRUCTURE, SIDEWALKS HPC	CUBIC YARD
CONCRETE IN SUPERSTRUCTURE, PARAPETS HPC	LINEAR FOOT

THE 19TH PAY ITEM IS DELETED.

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.

The Pay Item "Concrete in Superstructure Deck Slabs, HPC" will include payment for use of HPC for sidewalks and concrete bridge railings.

The pay item "Concrete in Substructures, HPC" will include payment for use of HPC for substructure member protection concrete.

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.

C. 1. Steel.

THE FIRST SENTENCE IS CHANGED TO:

Steel that is to be used in the bearing assemblies shall conform to AASHTO M 270, Grades 36 or 50, except for steel that is used for guide bars and shear restriction pins and sleeves.

D. 1. b. (7)

THE 2ND SENTENCE IS DELETED.

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.

THE SUBPART 1 IS CHANGED TO:

1. Steel bridge bearings and HLMR bearing assemblies are considered to be main load carrying members.

THE SUBPART 2 A IS CHANGED TO:

2. a. Simple Steel Bridge Structures (SBr): Includes highway sign support structures, parts for bridges (such as cross frames), unsplined rolled steel bridges, steel bridge bearings and HLMR bearing assemblies.

THE SUBPART 4 c IS CHANGED TO:

4. c. Fracture Control Plan. Steel bridge members or member components designated as Fracture Critical Members (FCM's) shall conform to the provisions of the most current edition of the AASHTO/AWS D1.5 Bridge Welding Code, Section 12 "AASHTO/AWS Fracture Control Plan (FCP) for Non-Redundant Members".

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.

503.15 Cleaning and Painting of Structural Steel.

A. 4. f

THE FOLLOWING IS ADDED AFTER THE FIRST SENTENCE:

Surfaces of steel that will be embedded in concrete shall be given a prime coat of paint only.

F. 3. b

SUBPART B IS CHANGE TO:

With the exception of steel designated to be galvanized, all structural steel for a distance away from the ends of the girders of 1.5 times the depth of the girder or a maximum of 6 feet shall be cleaned and painted.

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:

<i>Pay Item</i>	<i>Pay Unit</i>
STEEL BEARINGS FOR PRESTRESSED CONCRETE BEAMS	LUMP SUM

THE FOLLOWING PAY ITEM IS ADDED:

<i>Pay Item</i>	<i>Pay Unit</i>
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 508 - METAL BRIDGE RAILING AND FENCE

THE FOLLOWING IS ADDED:

508.01 Description.

This work shall consist of the furnishing and installation of 3-foot high and 6-foot high ornamental iron fencing, and all hardware and appurtenances, on top of the retaining walls and bridge wingwalls, as indicated on the plans.

508.02 Materials.

Ornamental iron fencing shall be as manufactured by the following or an approved equal:

Monumental Iron Works by Master-Halco, 1704 Trimble Road, Edgewood, MD 21040
Item Name: St. Charles Ave. 3 rail fence with spear finial, square tubular pickets,
rails, ball post caps and brown color

OR

Metropolitan Fence, 1304 East Main Street, Waukesha, WI 53186
Item Name: Lexington Style fence with Majestic finials and brown color

OR

Texas Iron Fence & Gate Company, 1807 North Business 287, Decatur, TX 76234
Item Name: Model 1 fence with welded construction, round solid pickets, third
rail mounted below top rail and brown color

508.04 Construction Requirements.

Ornamental iron fencing shall be installed in accordance with the manufacturer's recommendations. Working drawings shall be supplied by the Contractor and shall be furnished according to Subsection 105.04.

Before fabrication of Ornamental Iron Fencing, the Contractor shall submit complete working drawings to the Engineer and the Landscape and Urban Design unit for approval according to Subsection 105.04. Working drawings shall show precise mounting details.

508.08 Method of Measurement.

Ornamental iron fencing will be measured by the linear foot.

508.09 Basis of Payment.

Payment will be made under:

<i>Pay Item</i>	<i>Pay Unit</i>
ORNAMENTAL IRON FENCING, 3' HIGH	LINEAR FOOT
ORNAMENTAL IRON FENCING, 6' HIGH	LINEAR FOOT

SECTION 519 - PREFABRICATED MODULAR WALLS

519.01 Description.

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

This work shall also include the application of a special surface finish at the outboard face of the prefabricated modular wall.

THE SECOND SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

To verify the approved listing of Prefabricated Modular 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>

519.02 Materials.

2. Joint Filler Material.

THE SECOND SENTENCE IS CHANGED TO:

Filler for front face horizontal joints between units shall be closed-cell polyethylene foam backer rod conforming to AASHTO M153, Type 1, fiber expansion joint material and shall be in conformance with 908.01.

THE FOLLOWING IS ADDED:

Special surface finish applicators shall have a minimum of five consecutive years of experience in textured/colored concrete construction. Furnish evidence to the satisfaction of the Engineer, that the proposed products have been successfully used in similar applications. Prototypes of the formliner pattern shall be submitted to the Engineer and a representative of the Landscape and Urban Design Unit prior to fabrication for review and approval.

The outboard face of the prefabricated modular wall shall utilize Pattern Number 16985 "Indiana River Rock" as manufactured by Fitzgerald Formliners, or approved equal. The finish shall visually continue uninterrupted.

Prior to fabrication of formliners required for the project, sample panels for each component, 5 feet by 5 feet minimum, shall be cast using actual job site materials and construction techniques. The final color and surface pattern are subject to approval by the Engineer and a representative of the Landscape and Urban Design Unit. The Contractor shall not begin placing any special surface treatments without written approval from the Engineer.

519.03 Construction.

D. Installation.

3. Compaction of Backfill Material.

f.

THE SECOND SENTENCE IS CHANGED TO:

AASHTO T 310 (Direct Transmission Method) shall be used to determine the achieved density.

519.06 Basis of Payment.

THE FOLLOWING IS ADDED:

No additional payment will be made for the formlined and tinted prefabricated modular wall and wall parapet. The cost thereof will be included in the respective retaining wall pay item.

No separate payment will be made for the wall parapet. The cost thereof will be included in the respective retaining wall pay item.

SECTION 520 - MECHANICALLY STABILIZED EARTH (MSE) WALLS

520.01 Description.

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

This work shall also include the application of a special surface finish at the outboard face of the prefabricated modular wall.

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.

THE FOLLOWING IS ADDED:

Special surface finish applicators shall have a minimum of five consecutive years of experience in textured/colored concrete construction. Furnish evidence to the satisfaction of the Engineer, that the proposed products have been successfully used in similar applications. Prototypes of the formliner pattern shall be submitted to the Engineer and a representative of the Landscape and Urban Design Unit prior to fabrication for review and approval.

The outboard face of the prefabricated modular wall shall utilize Pattern Number 16985 "Indiana River Rock" as manufactured by Fitzgerald Formliners, or approved equal. The finish shall visually continue uninterrupted.

Prior to fabrication of formliners required for the project, sample panels for each component, 5 feet by 5 feet minimum, shall be cast using actual job site materials and construction techniques. The final color and surface pattern are subject to approval by the Engineer and a representative of the Landscape and Urban Design Unit. The Contractor shall not begin placing any special surface treatments without written approval from the Engineer.

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.

520.06 Basis of Payment.

THE FOLLOWING IS ADDED:

No additional payment will be made for the formlined and tinted prefabricated modular wall and wall parapet. The cost thereof will be included in the respective retaining wall pay item.

No separate payment will be made for the wall parapet. The cost thereof will be included in the respective retaining wall pay item.

SECTION 523 – DRILLED SHAFTS

523.01 Description.

This work shall consist of the provision of all labor, materials, equipment and services necessary to perform all operations to complete the construction of drilled shaft foundations in accordance with these Specifications, and any project specific Special Provisions and in accordance with the details and dimensions shown on the Plans. Drilled shafts shall consist of reinforced or unreinforced concrete. The following requirements shall be met prior to the performance of the work.

- A. **Qualifications of Drilled Shaft Contractor.** The Contractor or Subcontractor, herein referred to as the Contractor, who is to perform the work described in these Specifications shall have installed drilled shafts of both diameter and length similar to those shown on the Plans for a minimum of three (3) years prior to the bid date for this Project.
- B. **Submittals.** At the time of bid, the Contractor shall submit both a list containing at least three (3) projects completed in the last three (3) years in which he has installed drilled shafts of diameter and length similar to those shown on the Plans. The list of projects shall contain names and phone numbers of owner's representatives who can verify the Contractor's participation in those projects. Also, a signed statement that he has inspected both the project site and all subsurface information made available in the contract documents, including any soil or rock samples referenced in the contract documents, shall be submitted.

No later than one month prior to the initialization of the drilled shaft construction, the Contractor shall submit an installation plan for review by the Engineer. This plan shall provide information to document the following criteria:

1. Name and experience record of the drilled shaft superintendent who will be in charge of drilled shaft operations for the project.
2. List of proposed equipment to be used, including cranes, drills, augers, bailing buckets, final cleaning equipment, desanding equipment, slurry pumps, core sampling equipment, tremies or concrete pumps, casing, etc.
3. Details of the overall construction operation sequence and the sequence of shaft construction in bents or groups.
4. Details of shaft excavation methods.
5. When the use of slurry is anticipated, details of the slurry mix design and its suitability for the subsurface conditions at the construction site, mixing and storage methods, maintenance methods, and disposal procedures.
6. Details of methods to clean the shaft excavation.
7. Details of reinforcement placement, including support and centralization methods.
8. Details of concrete placement, including proposed operational procedures for tremie or pumping methods.
9. Details of casing installation and removal methods.

The Engineer will review the drilled shaft installation plan for conformance with the Plans, Specifications and Special Provisions. The Engineer will notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. All procedural approvals given by the Engineer shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the Plans and Specifications.

523.02 Materials.

Concrete shall conform to Section 501. Reinforcement steel shall conform to Subsection 915.01. As applicable, criteria for the furnishing of concrete structures, as specified in Section 501, shall be adhered to.

523.03 Construction Methods and Equipment.

- A. Protection of Existing Structures.** The Contractor shall control his operations to prevent damage to existing structures and utilities. Preventive measures shall include, but are not limited to, selecting construction methods and procedures that will prevent caving of the shaft excavation, and monitoring and controlling the vibrations from construction activities such as the driving of casing or sheeting, and drilling of the shaft.
- B. Construction Sequence.** Excavation to the required tip elevation shall be completed before initialization of shaft construction. Otherwise, if noted in the contract documents or approved by the Engineer, this requirement may be waived. Any disturbance to the excavated area caused by shaft installation shall be repaired by the Contractor prior to the shaft pour.
- C. General Methods and Equipment.** The Contractor shall perform the excavations required for drilled shafts through whatever materials are encountered, to the dimensions and elevations shown on the Plans or otherwise required by the Specifications and Special Provisions. The Contractor's methods and equipment shall be suitable for the intended purpose and materials encountered. The permanent casing method shall be used only at locations shown on the Plans or when authorized by the Engineer. Blasting will not be permitted.
 1. **Dry Construction Method.** The dry construction method shall be used only at sites where the ground water level and soil and rock conditions are suitable to permit construction of the shaft in a relatively dry excavation, and where the sides and bottom of the shaft may be visually inspected by the Engineer prior to placing the concrete. The dry method shall consist of drilling the shaft excavation, removing accumulated water and loose material from the excavation, placing the reinforcing cage, and concreting the shaft in a relatively dry excavation.
 2. **Wet Construction Method.** The wet construction method shall be used at sites where a dry excavation can not be maintained for placement of the shaft concrete. This method shall consist of using a slurry (mineral or

polymer) to maintain stability of the borehole perimeter while advancing the excavation to final depth, placing the reinforcing cage, and concreting the shaft. Where drilled shafts are located in open water areas, exterior casings shall be extended from above the water elevation into the ground to protect the shaft concrete from water action during placement and curing of the concrete. The exterior casing shall be installed in a manner that will produce a positive seal at the bottom of the casing so that no piping of water or other materials occurs into or from the shaft excavation.

3. **Casing Construction Method.** The casing method shall be used either when shown on the Plans or at sites where the dry or wet construction methods are inadequate to prevent hole caving or excessive deformation of the hole. In this method, the casing shall be either placed in a predrilled hole or advanced through the ground by twisting, driving, or vibration before being cleaned out.
4. **Excavation and Drilling Equipment.** The excavation and drilling equipment shall have adequate capacity, including power, torque and down thrust to excavate a hole of both the maximum diameter and to a depth of 20 percent beyond the depths shown on the plans.

The excavation and overreaming tools shall be of adequate design, size and strength to perform the work shown on the plans or described herein. When the material encountered cannot be drilled using conventional earth augers with soil or rock teeth, drill buckets, grooving tools, and/or underreaming tools, the Contractor shall provide special drilling equipment, including but not limited to: rock core barrels, rock tools, air tools, and other equipment as necessary to construct the shaft excavation to the size and depth required.

Sidewall overreaming shall be required when the sidewall of the hole is determined by the Engineer to have either softened due to excavation methods, swelled due to delays in concreting, or degraded because of slurry cake buildup. Overreaming thickness shall be a minimum of ½" and a maximum of 3". The thickness and elevation of sidewall overreaming shall be as directed by the Engineer. The Contractor shall bear all costs associated with both sidewall underreaming and additional shaft concrete placement.

- D. **Excavations.** Shaft excavations shall be made at locations and to the top of shaft elevations, estimated bottom of shaft elevations, shaft geometry and dimensions shown in the contract documents. The Contractor shall extend drilled shaft tip (base) elevations when the Engineer determines that the material encountered during excavation is unsuitable and/or differs from that anticipated in the design of the drilled shaft.

Drilled shafts shall be socketed into sound rock as shown on the Plans. Estimated rock socketing lengths are shown on the Plans. The top of rock socket elevation shown on the plans has been estimated based on test borings. The actual top of rock socket may vary in the field. The top of rock sound enough to begin the socket shall be defined by the Engineer based on the existing borings and observations during shaft drilling. Weathered or highly fractured rock as determined by the Engineer, shall not be considered sufficient for the top of rock socket. The rock socket shall begin beneath any weathered or highly fractured rock encountered and may be lower than determined by the Engineer's interpretation of existing borings.

The Engineer shall be the sole judge as to when top of rock sound enough to begin the socket has been encountered in the field. The design rock socket length shown on the plans shall begin at or below the depth determined by the Engineer.

The Contractor shall maintain a construction method log during shaft excavation. The log shall contain information such as: the description and approximate top and bottom elevation of each soil or rock material encountered, seepage or ground water, and remarks, including description of the tools and drill rigs used and any changes necessitated by changing ground conditions.

Excavated materials that are removed from shaft excavations shall be disposed of by the Contractor in accordance with Subsection 202.12.

The Contractor shall not permit workers to enter the shaft excavation for any reason unless: the Contractor has verified that dangerous gases are not present and both a suitable casing has been installed and the water level has been lowered and stabilized below the level to be occupied, and adequate safety equipment and procedures as per OSHA requirements have been provided to workers entering the excavation.

1. **Obstructions.** Surface and subsurface obstructions at drilled shaft locations shall be removed by the Contractor. Such obstructions may include man-made materials such as old concrete foundations and natural materials such as boulders. Special procedures and/or tools shall be employed by the Contractor after the hole cannot be advanced using conventional augers, drilling buckets and/or underreaming tools. Such special procedures/tools may include but are not limited to: chisels, boulder breakers, core barrels, air tools, hand excavation, temporary casing, and increasing hole diameter. Explosive blasting shall not be permitted.
2. **Lost Tools.** Drilling tools that are lost in the excavation shall not be considered obstructions and shall be promptly removed by the Contractor without compensation. All costs due to lost tool removal shall be borne by the Contractor including, but not limited to, cost associated with the repair of hole degradation due to removal operations or and excessive time that the hole remains open.

E. Casings. Casings shall be steel, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified diameter of the shaft, and the outside diameter of any excavation made below the casing shall not be less than the specified diameter of the shaft. No extra compensation will be allowed for concrete required to fill an oversized casing or oversized excavation. All casings, except permanent casings, shall be removed from shaft excavations. Any length of permanent casing installed below the shaft cutoff elevation, shall remain in place.

When the shaft extends above ground or through a body of water, the portion exposed above ground or through a body of water may be formed with removable casing except when the permanent casing is specified. Removable casing shall be stripped from the shaft in a manner that will not damage the concrete. Casings can be removed when the concrete has attained sufficient strength provided: curing of the concrete is continued for a 72-hour period; the shaft concrete is not exposed to salt water or moving water for 7 days; and the concrete reaches a compressive strength of least 2500 psi, as determined from concrete cylinder breaks.

F. Permanent Casing. Permanent casing shall be used when shown on the contract documents. The casing shall be continuous between top and bottom elevations detailed in the plans. After installation is complete, the permanent casing shall be cut off at the prescribed elevation and the shaft completed by installing necessary reinforcing steel and concrete in the casing.

In cases where special temporary casings are shown on the plans or authorized in writing by the Engineer to be used in conjunction with permanent casing, the Contractor shall maintain both alignment of the temporary casing with the permanent casing and a positive, watertight seal between the two casings during excavation and concreting operations.

G. Slurry. Mineral or polymer slurries shall be employed when slurry is used in the drilling process, unless other drilling fluids are approved in writing by the Engineer. Mineral slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the material suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement.

During construction, the level of slurry shall be maintained at a height sufficient to prevent caving of the hole. In the event of a sudden significant loss of slurry to the hole, the construction of that foundation shall be stopped until either a method to stop slurry loss or an alternate construction procedure has been approved by the Engineer.

Mineral slurry shall be premixed thoroughly with clean fresh water and adequate time (as prescribed by the mineral manufacturer) shall be allotted for hydration prior to introduction into the shaft excavation. Slurry tanks of adequate capacity will be required for slurry circulation, storage, and treatment. No excavated slurry pits will be allowed in lieu of slurry tanks without the written permission of the Engineer. Desanding equipment shall be provided by the Contractor, as necessary, to control slurry sand content to less than 4 percent by volume at any point in the borehole at the time the slurry is introduced. This will include situation in which temporary casing will be used. Desanding will not be required for sign post or lighting mast foundations unless shown in the plans or special provisions. The Contractor shall take all steps necessary to prevent the slurry from "setting up" in the shaft. Such

methods may include but are not limited to: agitation, circulation and/or adjusting the properties of the slurry. Disposal of all slurry shall be done off site in suitable areas by the Contractor.

Control tests using suitable apparatus shall be carried out on the mineral slurry by the Contractor to determine density, viscosity, and pH. An acceptable range of values for such physical properties is shown in the following table:

MINERAL SLURRY

(Sodium Bentonite or Attapulgite in Fresh Water)

Acceptable Range of Values

<u>Property (Units)</u>	<u>At Time of Slurry Introduction</u>	<u>In Hole at Time of Concreting</u>	<u>Test Method</u>
Density (pcf)	64.3*-69.1*	64.3*-75.0*	Density Balance
Viscosity (sec./quart)	28-45	28-45	March Funnel
pH	8-11	8-11	pH paper, pH meter

* Increase by 2 pcf in salt water.

Notes:

- a. Tests should be performed when the slurry temperature is above 40 degrees Fahrenheit.
- b. If desanding is required; sand content shall not exceed 4 percent by volume at any point in the borehole as determined by the American Petroleum Institute sand content test when the slurry is introduced.

Tests to determine density, viscosity and pH value shall be performed during the shaft excavation to establish a consistent working pattern. A minimum of four sets of tests shall be made during the first 8 hours of slurry use. When the results show consistent behavior, the testing frequency may be decreased to one set per every four hours of slurry use.

If the Contractor proposes to use a polymer slurry, either natural or synthetic, it must be a product approved for use by the State. Slurry properties at the time of mixing and at the time of concreting must be in conformance with the written recommendations of the manufacturer. However, whatever product is used, the sand content at the base of the drilled shaft excavation shall not exceed 1 percent when measured by Method API 13B-1, Section 5, immediately prior to concreting.

If the Contractor proposes to use a blended mineral-polymer slurry, he shall submit a detailed report, specific to the project, prepared and signed by a qualified slurry consultant describing the slurry materials, the mix proportions, mixing methods and quality control methods.

If polymer slurry, or blended mineral-polymer slurry is proposed, the Contractor's slurry management plan shall include detailed provisions for controlling the quality of the slurry. This shall include tests to be performed, the frequency of those tests, the test methods, and the maximum and/or minimum property requirements that must be met to ensure that the slurry meets the intended functions in the subsurface conditions at the construction site and with the construction methods that are to be used. The slurry management plan shall include a set of the slurry manufacturer's written recommendations and shall include the following tests, as a minimum:

1. Density Test (API 13B-1, Section 1)
2. Viscosity Test ((Marsh funnel and cup, API 13B-1), Section 2.2 or approved viscometer).
3. pH Test (pH meter, pH paper), and
4. Sand Content Test (API sand content kit, API 13B-1, Section 5).

If approved by the Engineer, the Contractor may use only water as a drilling fluid. In that case, all of the provisions in the above Table shown in this section for mineral slurries shall be met, except that the maximum density shall not exceed 70 pcf.

The Contractor shall insure that a heavily contaminated slurry suspension, which could impair the free flow of concrete, has not accumulated in the bottom of the shaft. Prior to placing concrete in any shaft excavation, the Contractor shall take slurry samples using a sampling tool approved by the Engineer. Slurry samples shall be extracted from the base of the shaft and at intervals not exceeding 10 feet up the slurry column in the shaft, until two consecutive samples produce acceptable values for density, viscosity, and pH.

When any slurry samples are found to unacceptable, the Contractor shall take whatever action is necessary to bring the slurry within specification requirements. Concrete shall not be poured until the slurry in the hole is re-sampled and test results produce acceptable values.

Reports of all tests required above shall be signed by an authorized representative of the Contractor and shall be furnished to the Engineer on completion of each drilled shaft.

During construction, the level of mineral or blended mineral-polymer slurry in the shaft excavation shall be maintained at a level not less than 4 feet above the highest expected piezometric pressure head that is along the depth of the shaft. The level of polymer slurry shall be maintained at a level not less than 6 feet above the highest expected piezometric pressure head that is along the depth of the shaft. If at any time the slurry construction method fails, in the opinion of the Engineer, to produce the desired final results, then the Contractor shall both discontinue this method and proposed an alternate method for approval by the Engineer.

- H. Excavation Inspection.** The Contractor shall provide equipment for checking the dimensions and alignment of each shaft excavation. The dimensions and alignment shall be determined by the Contractor under the direction of the Engineer. Final shaft depths shall be measured with a suitable weighted tape or other approved methods after less than 1/2" of sediment at the time of placement of the concrete. The maximum depth of sediment or any debris at any place on the base of the shaft shall not exceed 1.5". Shaft cleanliness will be determined by the Engineer, by visual inspection for dry shafts or other methods deemed appropriate by the Engineer for wet shafts. In addition, for dry excavations, the maximum depth of water shall not exceed 3" prior to concrete pour.

For dry shafts, the sidewalls shall be visually free of cuttings that may have been smeared on the walls during the removal and insertion of drilling tools.

- I. Construction Tolerances.** Unless otherwise stated in the contract documents, the following construction tolerances apply to drilled shafts:

1. The center of the drilled shaft shall be within 3" of plan position in the horizontal plane at the plan elevation for the top of the shafts.
2. The vertical alignment of a vertical shaft excavation shall not vary from the plan alignment by more than 1/4" per foot of depth.
3. After all the concrete is placed, the top of the reinforcing steel cage shall be no more than 6" above and no more than 3" below plan position.
4. All casing diameters shown on the plans refer to O.D. (outside diameter) dimensions. The dimensions of casings are subject to American Pipe Institute tolerances applicable to regular steel pipe. When approved, the Contractor may elect to provide a casing larger in diameter than shown in the plans.
5. The top elevation of the shaft shall have a tolerance of plus 1" or minus 3" from the plan top-of-shaft elevation.
6. Excavation equipment and methods shall be designed so that the completed shaft excavation will have a planar bottom. The cutting edges of excavation equipment shall be normal to the vertical axis of the equipment within a tolerance of (3/8 inch per foot) of diameter.

Drilled shaft excavations and completed shafts not constructed within the required tolerances are unacceptable. The Contractor shall be responsible for correcting all unacceptable shaft excavations and completed shafts to the satisfaction of the Engineer. Materials and work necessary, including engineering analysis and redesign, to complete corrections for out-of-tolerance drilled shaft excavations shall be furnished without either cost to the State or an extension of the completion date of the project.

J. Reinforcing Steel Cage Construction and Placement.

Reinforcement steel shall conform to the provisions of Subsection 915.01, Subpart C. Deformed Bars, Epoxy Coated.

The reinforcing steel cage, consisting of longitudinal bars, ties, cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted, and prior to concrete placement. Internal stiffeners shall be removed as the cage is placed in the borehole so as not to interfere with the placement of concrete.

The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances given in Subpart J. of this Specification. Concrete spacers or other approved non-corrosive spacing devices shall be used at sufficient intervals {near the bottom and at intervals not exceeding 10' up the shaft}. Concentric spacing for the entire cage length shall be provided. Spacers shall be constructed of approved material equal in quality and durability to the concrete specified for the shaft. The spacers shall be of adequate dimension to insure a minimum 3" annular space between the outside of the reinforcing cage and the side of the excavated hole. Approved cylindrical concrete feet (bottom supports) shall be provided to insure that the bottom of the cage is maintained at the proper distance above the base.

The elevation of the top of the steel cage shall be checked before and after the concrete is placed. If the upward displacement of the rebar cage exceeds 2" or if the downward displacement exceeds 6" per 20' of shaft length, the drilled shaft will be considered defective. Corrections shall be made by the Contractor to the satisfaction of the Engineer. No additional shafts shall be constructed until the Contractor has modified his rebar cage support in a manner satisfactory to the Engineer.

K. Characteristics of Drilled Shaft Concrete.

Concrete for drilled shafts shall be designed and placed in such a manner that it can be pumped, be dropped or flow through a tremie by gravity to the bottom of the excavation; flow easily through the rebar cage without vibration (so that the concrete is not inadvertently mixed with drilling fluid, ground water or soil); displace drilling slurry or water while rising in a narrow borehole and in the annular space between the cage and the borehole wall; and will not segregate or become leached of cement paste in the process. Simultaneously, it shall have the appropriate strength, stiffness and durability after it has cured.

Drilled shaft concrete and aspects of construction of drilled shafts related to concreting are discussed in ACI 336.1 (ACI, 1994).

When it is necessary to place the concrete under the wet construction method, placement may tend to destabilize the borehole (for example, in lightly cemented sands or sand deposits that are stable during drilling because of capillary moisture and that can collapse from the stress waves produced by the falling concrete), concrete for drilled shafts must be placed using a gravity-fed tremie or by pumping.

The characteristics of developed concrete mixes for drilled shafts shall meet the following criteria:

1. **Excellent workability:** The concrete shall have the ability to flow readily through the tremie, to flow laterally through the rebar cage, and to impose a high lateral stress against the sides of the borehole.
2. **Self-weight compaction:** With the exception of very near the surface, vibration of concrete in a borehole shall not be attempted.

3. **Resistance to segregation:** The concrete mix should have a high degree of cohesion and should be free of large-sized coarse aggregate.
4. **Resistance to leaching:** The designed mix should be resistant to flowing ground water.
5. **Controlled setting:** The concrete should retain its fluidity throughout the depth of the borehole during the full time required for complete placement of the concrete in the borehole in order to maximize the ground pressures that are imposed by the fluid concrete. Slow setting is also required to allow for inevitable delays that may occur during concreting (interrupted concrete supply, difficulties in extracting casing, etc.). At the same time, it should attain an appropriate strength within a reasonable time after placement.
6. **Good durability:** If the subsurface environment is aggressive, or can become aggressive during the life of the foundation, the concrete should be designed to have high density and low permeability so that the concrete is able to resist the negative effects of the environment.
7. **Appropriate strength and stiffness:** Provision of appropriate tensile strength for the appropriate compressive strength where high levels of combined bending and axial stress occur must be accounted for in the developed mix design.
8. **Low heat of hydration for large volumes of concrete:** Careful attention shall be given to the design of concrete for large-diameter drilled shafts so that excessive heat does not produce thermal tensile cracking.

L. Concrete Mix Design. Concrete shall conform to Section 501.

M. Concrete Placement. Concrete placement shall be performed in accordance with the applicable portions of Section 501 and with the requirements herein.

Concrete shall be placed as soon as possible after reinforcing steel placement. Concrete placement shall be continuous from the bottom to the top elevation of the shaft. Concrete placement shall continue after the shaft excavation is filled and until good quality concrete is evident at the top of shaft. Concrete shall be placed through a tremie or concrete pump.

The elapsed time from the beginning of concrete placement in the shaft to the completion of the placement shall not exceed 2 hours. All admixtures, when approved for use, shall be adjusted for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the 2-hour placement limit. Prior to concrete placement the Contractor shall provide test results of both a trial mix and a slump loss test conducted by an approved testing laboratory using approved methods to demonstrate that the concrete meets this 2-hour requirement. The Contractor may request a longer placement time provided he or she supplies a concrete mix that will maintain a slump of 4" or greater over the longer placement time as demonstrated by trial mix and slump loss tests. The trial mix and slump loss tests shall be conducted using concrete and ambient temperatures appropriate for site conditions.

1. **Tremies.** Tremies may be used for concrete placement in either wet or dry holes. Tremies used to place concrete shall consist of a tube of sufficient length, weight, and diameter to discharge concrete at the shaft base elevation. The tremie shall not contain aluminum parts that will have contact with the concrete. The tremie inside diameter shall be at least 6 times the maximum size of aggregate used in the concrete mix but shall not be less than 10". The inside and outside surfaces of the tremie shall be clean and smooth to permit both flow of concrete and unimpeded withdrawal during concreting. The wall thickness of the tremie shall be adequate to prevent crimping or sharp bends, which restrict concrete placement.

The tremie used for wet excavation concrete placement shall be watertight. Underwater or under-slurry placement shall not begin until the tremie is placed to the shaft base elevation, and the concrete shall be kept completely separated from the water or slurry prior to the time it is discharged. Valves, bottom plates or plugs may be used for this purpose only if concrete discharge can begin within one tremie

diameter of the base of the drilled shaft. Plugs shall either be removed from the excavation or be of a material, approved by the Engineer, which will not cause a defect in the shaft if not removed. The discharge end of the tremie shall be constructed to permit the free radial flow of concrete during placement operations. The tremie discharge end shall be immersed at least 5 feet in concrete at all times after starting the flow of concrete. The flow of the concrete shall be continuous. The level of the concrete in the tremie shall be maintained above the level of slurry or water in the borehole at all times to prevent water or slurry intrusion into the shaft concrete.

2. Pumped Concrete. Concrete pumps and lines may be used for concrete placement in either wet or dry excavations. All pump lines shall have a minimum 4" diameter and be constructed with watertight joints. Concrete placement shall not begin until the pump line discharge orifice is at the shaft base elevation.

For wet excavations, a plug or similar device shall be used to separate the concrete from the fluid in the hole until pumping begins. The plug shall either be removed from the excavation or be of a material, approved by the Engineer, that will not cause a defect in the shaft if not removed.

The discharge orifice shall remain at least (5 feet); below the surface of the fluid concrete. When lifting the pump line during concreting, the Contractor shall temporarily reduce the line pressure until the orifice has been repositioned at a higher level in the excavation.

If at any time during the concrete pour the pump line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete level, the shaft shall be considered defective. In such case, the Contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall removal directed by the Engineer, and repour the shaft. All costs of replacement of defective shafts shall be the responsibility of the Contractor.

Osterberg Cell Load Test

- A. Description.** The work of this Section consists of the requirements for Osterberg cell load testing on selected drilled shafts prior to installing production drilled shafts, as shown on the Contract Drawings and as directed by the Engineer. The instrumentation for the above tests shall be installed on the selected drilled shafts by the Osterberg Cell supplier or others, as approved by the Engineer. The O-Cell load tests are non-destructive tests, and the Cell tested caissons shall be left in a condition suitable for use as production caissons in the finished structure. The purpose of the load test is to determine the end bearing capacity and the friction/adhesion resistance of the soil. The Contractor shall allow up to four weeks after completion of the final load test to allow the analysis of the load test data and revisions to foundation lengths and installation procedures required, based on the results of the load test. All work under this Section shall be performed in the presence of the Engineer or his representative.

The proposed instrumentation locations (including support details for the CSL tubes) shall be submitted for appropriate and are subject to change following the review of the boring data by the Engineer.

The work shall consist of furnishing all materials and labor necessary for conducting Osterberg cell load tests and reporting the results. The Contractor shall supply all material and labor necessary prior to, during and after the load test as hereinafter specified. The test drilled shaft shall be constructed at a production drilled shaft location and shall be left in a condition suitable for use as a production drilled shaft in the finished structure.

B. Quality Assurance

Reference Standards:

American Society for Testing and Materials (ASTM):

D 1143, Method of Testing Piles under Static Axial Compressive Load.

The Contractor shall employ a testing firm which has successfully completed no less than three Osterberg cell load tests to perform the testing and report preparation. The qualifications of the testing firm shall be submitted to the Engineer for approval.

C. Submittals.

The Contractor shall submit a testing plan which outlines the test set-up data collection system and procedures to the Engineer for approval. Load test report shall be submitted to the Engineer.

D. Materials

Osterberg Cell:

1. The Contractor shall furnish Osterberg cells as required for the load test program.
2. The Osterberg Cells to be provided should have a test capacity of at least the ultimate capacity of the drilled shaft in each direction and shall be equipped with all necessary hydraulic lines, fittings, pressure source, pressure gauge, strain gauges, and telltale devices.
3. The Contractor shall supply all equipment and materials required to install and monitor the Osterberg cell and strain gauges, conduct the load test, and monitor the reference system. The Contractor shall also supply the materials for construction of a stable reference beam system for monitoring movements of the drilled shaft during testing, supported at minimum distance of three diameters from the center of the drilled shaft to prevent disturbance of the reference system. The Contractor shall construct the aforementioned stable reference beam system.

E. General Procedures. The Contractor shall construct the drilled shaft selected for testing using the approved drilled shaft installation techniques.

The Osterberg cell, vibrating wire strain gauges, hydraulic supply and other attachments shall be assembled.

When the test drilled shaft has been constructed, inspected and accepted by the Engineer, a seating layer of concrete shall be placed by an approved method, in the base of the drilled shaft. The concrete shall be as specified in Section 501. The Contractor shall then install the Osterberg cell in the test drilled shaft (while the concrete is still fluid) so that the Osterberg cell is resting firmly in the concrete. The Contractor shall use the utmost care in handling the placement/test equipment assembly so as not to damage the instrumentation during the installation. The Contractor should provide a cage designed for the Osterberg cell to be mounted on it.

After seating the Osterberg cell assembly, the drilled shaft shall be concreted in the manner specified for production drilled shafts. However, if approved by the Engineer, the Contractor may use high early cement (Type III) in the mix to reduce the time between concreting and testing. At least six concrete compression test cylinders shall be molded from the concrete used in the test drilled shaft. At least one of these cylinders shall be tested prior to the load test and at least two cylinders shall be tested on the day of the load test. The Osterberg cell test shall not commence until the minimum concrete design compressive strength of 3000 psi has been achieved.

No additional drilled shaft installation shall take place until the Osterberg cell load test has been successfully completed. If during the period required to perform the load test, the test apparatus shows any signs of negative effects due to construction activities, such activities shall cease immediately.

After the completion of the load test, and at the direction of the Engineer, the Contractor shall grout the interior of the Osterberg cell using grouting techniques approved by the Engineer.

After the completion of the load test, and at the direction of the Engineer, the Contractor shall remove any equipment, material and waste which is not to be a part of the finished structure.

F. Post-Test Grouting Procedures. The Contractor shall grout the interior of the Osterberg cell and annular space around the outside of the Osterberg cell in order to reconnect the upper and lower shaft sections.

The grout shall be specified in 914.03 of these Specifications and shall consist of Portland cement and water only and shall not include sand.

The grout shall be fluid and pumpable. An initial mix consisting of four to six gallons of water per 95 lb. bag of cement is recommended with adjustments to water to obtain the desired consistency. The mixing should be thorough to ensure that there are no lumps of dry cement. The grout shall be passed through a window screen mesh before pumping. The Contractor shall provide an accurate flow meter to measure the amount of grout from the pump.

Grouting Osterberg Cell: Connect grout pump outlet to one hydraulic line of the Osterberg cell. Open the other line to allow hydraulic fluid to bleed. Pump grout through hydraulic line while collecting the effluent from the bleed line. Monitor characteristics of effluent material and when it becomes equivalent to grout being pumped, stop pumping. Take three samples of grout for compression testing at 28 days.

Grouting Annular Space Around Osterberg Cells: Pump water to “blow out” the bottom caps of the plastic grout lines (two on each drilled shaft). Pump the fluid grout through one of the plastic pipes until grout is observed flowing from the second grout pipe or until 1.5 times the theoretical volume has been pumped. If no return of grout is observed from the second grout pipe, transfer the pump to the second pipe and pump grout through it until 1.5 times the theoretical volume has been pumped. Take three samples of each type of grout for compression testing at 28 days. The entire grouting operation must be completed before the set time for the initial grout has elapsed.

G. Load Testing and Reporting. The load testing shall be performed in accordance with ASTM D 1143, Standard Test Method for Piles Under Static Axial Compressive Load. The loading procedures shall be in accordance with Standard Loading Procedures, indicated in ASTM D 1143, Section 5.1. The loads shall be applied in increments equaling ten percent of the anticipated ultimate capacity of the test drilled shaft.

Direct movement indicator measurements shall be made of the following:

1. Downward drilled shaft end-bearing movement (one indicator is required).
2. Upward top-of-drilled shaft movement (minimum of three indicators required).
3. Strain gauges (minimum of eight per test required).
4. Loads shall be applied at the prescribed intervals until the ultimate capacity of the drilled shaft is reached in either end bearing or side shear, or until the maximum capacity or maximum stroke of the Osterberg cell is reached, unless otherwise directed by the Engineer. In addition to requirements of ASTM D 1143, at each load increment, or decrement, movement indicators shall be read at 1.0, 2.0 and 4.0 minute intervals while the load is held constant. Strain gauges readings shall be concurrent with pile movement readings. Additional cycles of loading and unloading using similar procedures may be required by the Engineer following the completion of the initial test cycle.

Dial gauges, digital gauges or LVDTs used to measure end bearing, side shear movement and shaft compression should have a minimum travel of 8” and be capable of being read to the nearest 0.025 division. End bearing movement may be alternately monitored using LVDTs capable of measuring the expansion of the Osterberg cell (6”). The reference beam selected should have a minimum length equal to six times the drilled shaft diameter and should be monitored for movement during load testing using a surveyor’s level.

A report providing all data readings and plots of the readings, the details of the load test and set-up, as well as a determination of the end bearing and friction/adhesion shall be submitted for review.

523.05 Crosshole Sonic Logging (CSL) of Drilled Shaft.

All completed drilled shafts, including test shafts, shall be tested with the nondestructive testing (NDT) method Crosshole Sonic Logging (CSL) after at least 1 day (24 hours) of curing time has elapsed to allow the concrete to harden sufficiently. The Engineer may specify a longer minimum time if special retarders, mix designs or other factors result in slower-setting concrete. All CSL testing must be completed with 45 calendar days of concrete placement for steel access tubes. The CSL tests shall be undertaken by an experienced and approved independent testing organization. The Contractor shall employ a NJ registered Professional Engineer to perform, evaluate and report the tests. The Contractor shall be responsible for performing and submitting reports in a timely manner. The report on the tests on any given shaft must be submitted to the Engineer within 7 working days of the performance of the tests on that shaft. The Engineer will evaluate and analyze the results and provide to the Contractor a response regarding the acceptability of the shaft that was tested within 15 working days of receipt of the test report.

The CSL test measures the time it takes for an ultrasonic pulse to travel from a signal source in one access tube to a receiver in another access tube. In uniform, good quality concrete, the travel time between equi-distant tubes will be relatively constant and correspond to a reasonable concrete pulse velocity from the bottom to the top of the foundation. In uniform, good quality concrete, the CSL test will also produce records with good signal amplitude and energy. Longer travel times and lower amplitude/energy signals indicate the presence of irregularities such as poor quality concrete, void, honeycomb and soil intrusions. The signal will be completely lost by the receiver and CSL recording system for the more severe defects such as void and soil intrusions.

The Contractor shall employ a testing firm, which has successfully completed no less than three CSL to perform the testing and report preparation. The qualifications of the testing firm shall be submitted to the Engineer for approval.

- A. Drilled Shaft Preparation.** Four tubes shall be installed with 90 Degree angle spacing in each shaft to permit access for CSL. The access tubes for the cross hole sonic logging shall be placed on each reinforcing cage designated in the contract documents in the position and at the frequency shown on the plans. The Contractor shall submit to the Engineer his proposed method to install the tubes, prior to construction.

The tubes shall be 2" inside diameter steel pipe. The pipes shall have a round, regular internal diameter free of defects or obstructions, including any at pipe joints, in order to permit the free, unobstructed passage of 1-3/8" or smaller diameter, typically 6" to 10" long, source and receiver probes. The tubes shall be watertight and free from corrosion with clean internal and external faces to ensure a good bond between the concrete and the tubes.

The pipes shall each be fitted with a watertight shoe on the bottom and a removable cap on the top. The pipes shall be installed with a minimum cover of 3". The tubes shall be installed in each shaft in a regular, symmetric pattern such that each tube is spaced the maximum distance possible from each adjacent tube, with an equal spacing. The tubes shall be secured, such that the tubes stay in position during placement of concrete placement. The tubes shall extend from 6" above the shaft bottoms to at least 3' above the shaft tops. Under no circumstance should the tubes be allowed to rest on the bottom of the drilled excavation. If the shaft top is below the subsurface, the tubes shall extend at least 2' above the ground surface. Any joints required to achieve full length tubes shall be made watertight. Care shall be taken during reinforcement installation operations in the drilled shaft hole not to damage the tubes.

After placement, the tubes shall be filled with clean water as soon as possible (immediately before or after concrete placement – no later than 4 hours after placement) and the tube tops capped or sealed to keep debris out of the tubes. Care shall be exercised in the removal of caps or plugs from the pipes after installation so as not to apply excess torque, hammering, or other stresses which could break the bond between the tubes and the concrete.

Upon completion of CSL testing, and subject to approval by the Engineer, all water shall be removed from the access pipes and any other drilled holes. The pipes and holes shall then be completely filled with an approved grout. The pipes shall not be filled with grout until all testing is completed in a particular drilled shaft. This includes Crosshole Tomography, if any anomalies/defects indicated by longer pulse arrival times and significantly lower amplitude/energy signals should be reported to the Engineer on-site and any further tests carried out as required to evaluate the extent of such anomalies/defects.

B. Test Equipment:

The CSL equipment consists of the following components:

- A microprocessor based CSL system for display of individual CSL records, analog-digital conversion and recording of CSL data, analysis of receiver responses and printing of CSL logs.
- Ultrasonic source and receiver probes for 2" I.D. pipe, as appropriate.
- An ultrasonic voltage pulsar to excite the source with a synchronized triggering system to start the recording system.
- A depth measurement device to determine record depths.
- Appropriate filter/amplification and cable systems for CSL testing

- C. CSL Logging Procedures.** Information on the shaft bottom and top elevations and/or length, along with construction dates should be provided to the approved testing organization before or at the time of the CSL tests. CSL tests shall be conducted between pairs of tubes, with the determination of which pairs to be tested to be made as part of the testing contract. Typically, perimeter and/or major diagonal tube pairs are tested. Additional logs may be conducted in the event any anomalies are detected in the specified logs. The full depth of all pipes shall be used for conducting CSL tests unless approved otherwise by the Engineer. Prior to the beginning of cross hole sonic logging, the Contractor shall assure that the test probes can pass through every tube to the bottom. If the tube is obstructed, the Contractor shall, at the Contractor's expense, core a hole within the drilled shaft near the obstructed tube to the depth of the obstructed tube that is large enough to accommodate the probe for the full length of the hole. The coring equipment, coring procedure and location of the core hole shall be

approved by the Engineer prior to beginning the coring process. The coring method shall provide for complete core recovery and shall minimize abrasion and erosion of the core. The core hole shall be placed at a position in the shaft that will not produce damage to the reinforcing steel in the shaft. The core hole shall be logged, voids or defects indicated on the log submitted to the Engineer. Cores shall be preserved and made available for inspection by the Engineer. The core will be treated as an access tube and downhole testing shall then commence.

The CSL tests shall be carried out with the source and receiver probes in the same horizontal plane unless test results indicate potential anomalies/defects in which case the questionable zone may be further evaluated with angled tests (source and receiver vertically offset in the tubes). CSL measurements shall be made at depth intervals of 2-1/2" or less, and shall be done from the bottom to the top of each shaft. The probes shall be pulled simultaneously, starting from the bottoms of the tubes, over the depth measuring device. Any slack shall be removed from the cables prior to pulling to provide for accurate depth measurements in the CSL records. Any anomalies/defects indicated by longer pulse arrival times and significantly lower amplitude/energy signals should be reported to the Engineer on-site and any further tests carried out as required to evaluate the extent of such anomalies/defects.

D. CSL Results. The CSL results shall be presented in a report. The test results shall include CSL logs with analyses of:

- Initial pulse arrival time or compression wave velocity versus depth
- Pulse energy/amplitude versus depth

CSL log shall be presented for each tube pair tested with any anomaly/defect zones discussed in the report as appropriate.

E. Acceptance of Completed Drilled Shafts. The acceptance of each drilled shaft shall be decided by the Engineer, based on the results of the CSL report(s) and other information on the shaft placement. If the CSL records are inconclusive or show an anomaly, the Engineer may require coring or Crosshole Tomography to verify shaft conditions. The minimum diameter of produced concrete core sample shall be 2" and the maximum diameter shall be 4". The Contractor shall grout the core hole upon completion. The grout shall have the strength properties equivalent to or better than those of the drilled shaft concrete. The grout type and method shall be submitted to the Engineer for approval. The Contractor shall provide an accurate flow meter to measure the amount of flow. The details of the Crosshole Tomography, if required, shall be submitted to the Engineer for review and approval. If Crosshole Tomography is required, the Contractor shall employ a testing firm, which has successfully completed no less than three Crosshole Tomography tests to perform the testing and report preparation. The qualifications of the testing firm shall be submitted to the Engineer for approval.

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

523.06 Method of Measurement.

Furnishing Drilled Shaft Drilling Equipment. Payment for furnishing drilled shaft drilling equipment, when made at the contract lump sum amount, shall be full and complete payment for furnishing and moving the drilling equipment to the project site, setting the equipment up at the locations and removing the equipment from the project site. Payment of 60 percent of the amount bid for this item will be made when all drilling equipment is on the job site, assembled and ready to drill foundation shafts. Payment for the remaining 40 percent of the bid amount will be made when all shafts have been drilled and all shaft concrete has been placed up to the top of the shafts.

Drilled Shafts. Drilled shafts shall be paid for at the contract unit price per linear foot for drilled shaft of the diameter specified. This item shall include all excavation required for the installation of the drilled shafts. Such payment shall include the cost of concrete, and reinforcing steel, all labor, materials, equipment, temporary casing, slurry, and incidentals necessary to complete the drilled shaft.

Obstructions. Removal of obstructions shall be paid at the contract unit price per hour for obstructions. Such payment shall be full compensation for all labor, materials, and equipment necessary to complete the work, or fraction thereof per obstruction, after designation as an obstruction by the Engineer, required to remove the obstruction and resume excavation.

Permanent Casing. Permanent casings shall be paid for at the contract price per linear foot. Such price and payment shall be full compensation for furnishing and placing the permanent casing in the shaft excavation. The length to be paid for shall be measured along the casing from the top of the shaft elevation or the top of casing whichever is lower, to the bottom of casing at each shaft location where permanent casing is used.

Instrumentation and Data Collection. The lump sum bid price for instrumentation and data collection shall include all labor, equipment and materials incidental to instrumentation and, when required, data collection and the load test report.

Access Tubes. Access tubes will be paid for at the unit contract price per foot of access tube, installed in the drilled shafts, to the depths shown on the plans.

Osterberg Cell Load Testing. Measurement for the drilled shaft Osterberg cell load test shall include any material, labor and equipment, required to perform the load test. This item shall include all necessary work, including but not limited to, assembly and installation of the equipment, conducting the test, removing the load test equipment, grouting the cell and the annular space around the cell, and providing a report of the load test.

Crosshole Sonic Logging (CSL): Measurement for the drilled shaft Crosshole Sonic Logging (CSL) shall include any and all material, labor and equipment, required to test each drilled shaft. In addition, this item shall include all necessary work to assemble, install, conduct CSL, and providing a test report of the CSL.

Crosshole Tomography; Measurement for Crosshole Tomography shall include any and all material, labor and equipment required to perform the test at each drilled shaft requested by the Engineer. This item shall include any and all necessary work, including but not limited to, assembly and installation of the equipment, conducting the test, and providing a test report with conclusions and recommendations.

Concrete Coring at Drilled Shaft; Measurement for concrete coring at drilled shaft shall be by linear foot and include any and all material, labor and equipment required to core the shaft to a depth below any identified defects or anomalies, as requested by the Engineer. This item shall include all material, labor and equipment required for coring, grouting after coring, and providing a report of the coring result. If the coring confirms a defect in the drilled shaft then measurement will not be made and the Contractor shall bear the cost of the coring.

523.07 Basis of Payment.

Payment will be made under:

Pay Item	Pay Unit
FURNISHING DRILLED SHAFT DRILLING EQUIPMENT	LUMP SUM
DRILLED SHAFT	LINEAR FOOT
OBSTRUCTIONS	HOUR
PERMANENT CASING	LINEAR FOOT
INSTRUMENTATION AND DATA COLLECTION	LUMP SUM
ACCESS TUBES	LINEAR FOOT
OSTERBERG CELL LOAD TEST	UNIT
CROSSHOLE SONIC LOGGING (CSL) OF DRILLED SHAFT	UNIT
CROSSHOLE TOMOGRAPHY	UNIT
CONCRETE CORING AT DRILLED SHAFT	LINEAR FOOT
ROCK SOCKETS	LINEAR FOOT

No separate payment will be made for reinforcement steel and excavation required for drilled shafts. The cost of any reinforcement steel required for testing purposes shall be included in the drilled shaft pay item.

The contract items and unit price bids set forth in the bid schedules shall include all services, permits, labor, equipment, transportation, materials, and supplies for the complete work. No payment will be made for drilled shafts abandoned because of defects in the work or other fault of the Contractor or his drilled shaft subcontractor.

The completed and accepted Osterberg Cell Load Testing of Drilled Shafts shall be paid for at the Contract Unit Price per Each, and the price shall constitute full compensation for all costs incurred during the procurement, installation, conducting of the test, subsequent removal of test apparatus and appurtenances, grouting of the cell, and preparation of the load test report.

DIVISION 600 - INCIDENTAL CONSTRUCTION

SECTION 601 – UNDERDRAINS

601.06 Basis of Payment.

THE FOLLOWING IS ADDED:

<i>Pay Item</i>	<i>Pay Unit</i>
8" PERFORATED, CORRUGATED STEEL UNDERDRAIN PIPE	LINEAR FOOT

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.

Unless waived in the Special Provisions, video inspection of interior pipelines shall be made by the contractor no sooner than 30 days after completion of the pipe installation. The inspection shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit television.

The video surveillance shall take place in dry pipe conditions to ensure viewing of the entire pipe circumference. A visual numerical registration of the distance the video camera is traveling from the starting point to the ending point within the pipe drainage structure shall be recorded on the footage tape at all times. Also, the name of the pipe run and the name of the structure shall be recorded on the footage tape at all times. The video camera shall be stopped at all joints, lateral connections, breaks and irregularities to ensure full view at these locations. The videotape shall provide clear, sharply focused pictures. Blurred or out of focus footage will not be acceptable. The videotape shall be in color and in VHS format and submitted to the Resident Engineer to become the property of the state. Tapes shall be sequentially numbered and a corresponding typewritten index shall be provided for all tapes listing the location, date, size and type of pipe, cross drains, longitudinal, berm, slope, etc.

If the pipe is found to be defective because of poor joints, deformation, breaks, connections or irregularities, corrective action, up to and including removal and replacement of the defective pipe shall be made as directed. Additional payment will not be made for corrective action work.

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.
THE FOLLOWING IS ADDED:

Video inspection of pipe will be measured by the linear foot.

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 FOLLOWING PAY ITEMS ARE ADDED

___" HIGH DENSITY POLYETHYLENE PIPE	LINEAR FOOT
VIDEO INSPECTION OF PIPE	LINEAR FOOT
DEFLECTION TESTING OF HIGH DENSITY POLYETHYLENE PIPE	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:

This work shall also consist of the construction of outlet control structures and their respective trash racks.

603.02 Materials.
THE FOLLOWING IS ADDED:

Structural Steel	917.10
Zinc Coating	917.12

603.12 Method of Measurement.
THE FOLLOWING IS ADDED:

Outlet control structures will be measured by the unit.

603.13 Basis of Payment.
THE FOLLOWING IS ADDED:

<i>Pay Item</i>	<i>Pay Unit</i>
OUTLET CONTROL STRUCTURE	UNIT

SECTION 605 - 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 except at the following locations:

THE FOLLOWING WAS ADDED TO THIS SECTION:

BOLLARDS

605.12 Description.

This work shall consist of the furnishing and installation of traffic bollards, and all hardware and appurtenances as indicated on the plans.

605.13 Materials.

Traffic Bollards shall be as manufactured by the following or an approved equal:

Traffic Guard Direct, P.O. Box 201 Geneva, IL 60134

Telephone Number: (877) 727-7347

Item Name: Traffic Guard Single Post Bollard, Yellow

OR

Blue Ember Technologies, LLC, 7566 Main Street, Suite 113, Sykesville, MD 21784

Telephone Number: (410)-552-9888

Item Name: Maxiforce Traffic Bollard- Okeefe, Style: Colonial, Universal Base,

Color: Yellow

OR

Cal Pipe Manufacturing, 2207 165th Street, Hammond, IN 46320

Tele Phone Number: (800) 536-2248

Item Name: Super XP90R Removable Bollard w/ locking Key, Color Yellow

605.14 Construction Requirements.

Traffic Bollards shall be installed in accordance with the manufacturer's recommendations. Working drawings shall be supplied by the Contractor and shall be furnished according to Subsection 105.04.

Before fabrication of the Traffic Bollards, the Contractor shall submit complete working drawings to the Engineer and the Landscape and Urban Design unit for approval according to Subsection 105.04. Working drawings shall show precise installation details.

COMPENSATION

605.15 Method of Measurement.

Traffic Bollards will be measured by the Unit.

605.16 Basis of Payment.

Payment will be made under:

Pay Item

BOLLARDS

Pay Unit

UNIT

THE FOLLOWING WAS ADDED TO THIS SECTION:

PARKING STOP

605.17 Description.

This work shall consist of the furnishing and installation of parking stops, and all hardware and appurtenances as indicated on the plans.

605.18 Materials.

Parking stops shall be as manufactured by the following or an approved equal:

Flemington Precast & Supply, 18 Allen Street, Flemington, NJ 08822
Phone Number: (908) 732-3246
Item Name: Precast Concrete Parking Stop

OR

Faddis Concrete Products,
Phone Number: (800) 777-7973
Item Name: Parking Stop

OR

Stonex Cast Products, 127 Squankum-Yellowbrook Road, Farmingdale, NJ 07727
Phone Number: (732) 938-2334
Item Name: Parking Lot Bumpers - Car

605.19 Construction Requirements.

Parking stops shall be installed in accordance with the manufacturer's recommendations. Working drawings shall be supplied by the Contractor and shall be furnished according to Subsection 105.04.

Before fabrication of the parking stops, the Contractor shall submit complete working drawings to the Engineer and the Landscape and Urban Design unit for approval according to Subsection 105.04. Working drawings shall show precise installation details.

COMPENSATION

605.20 Method of Measurement.

Parking Stops will be measured by unit.

605.21 Basis of Payment.

Payment will be made under:

Pay Item

PARKING STOPS

Pay Unit

UNIT

SECTION 607 – SIDEWALKS AND DRIVEWAYS

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.

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.
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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.

607.07 Method of Measurement.

THE THIRD PARAGRAPH IS CHANGED TO:

Detectable Warning Surfaces will be measured by the square yard.

607.08 Basis of Payment.

THE FOLLOWING PAY ITEM IS DELETED:

<i>Pay Item</i>	<i>Pay Unit</i>
PUBLIC SIDEWALK CURB RAMP DELINEATION	SQUARE YARD

THE FOLLOWING PAY ITEM IS ADDED:

<i>Pay Item</i>	<i>Pay Unit</i>
DETECTABLE WARNING SURFACES	SQUARE YARD

SECTION 612 – BEAM GUIDE RAIL

612.08 Beam Guide Rail on Bridges.

THE FOURTH PARAGRAPH IS DELETED.

THE FOLLOWING WAS ADDED:

612.02 Materials.

Materials shall conform to the following Subsections:

Coating System.....	902.07
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612.03 Basis of Payment.

THE FOLLOWING ITEMS ARE ADDED:

<i>Pay Item</i>	<i>Pay Unit</i>
BEAM GUIDE RAIL WITH SPECIAL FINISH	LINEAR FOOT
BEAM GUIDE RAIL, WALL, WITH SPECIAL FINISH	LINEAR FOOT
SLOTTED GUIDE RAIL TERMINALS WITH SPECIAL FINISH	UNIT
CONTROLLED RELEASE TERMINALS WITH SPECIAL FINISH	UNIT

CONTROLLED RELEASE TERMINAL ANCHORAGE WITH SPECIAL FINISH
BEAM GUIDE RAIL ANCHORAGES WITH SPECIAL FINISH

UNIT
UNIT

SECTION 614 – FENCES

614.09 Basis of Payment.

THE FOLLOWING IS ADDED:

Pay Item
CURVED CHAIN LINK FENCE, 3' HIGH

Pay Unit
LINEAR FOOT

SECTION 617 - TRAFFIC CONTROL

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.)

617.10 Traffic Directors.

THE FOLLOWING NEW SUBPART IS ADDED

- C. **Emergency Towing Service.** Thirty days before the start of Construction Operations, the Contractor shall provide an Emergency Towing Service Plan for approval by the Resident Engineer, which shall indicate the type, quantity, and location of towing equipment to be used.

Emergency towing service shall be provided during those periods of time when construction operations require closure of a lane or lanes of traffic or as directed by the Resident Engineer. Emergency towing service shall consist of having personnel and equipment at the designated locations on the project site capable of removing disabled vehicles, without damage to the vehicle, from the construction zone to the nearest location that will permit the disabled vehicle to be legally parked without interfering with traffic. Emergency towing service shall respond immediately upon notice of a disabled vehicle by the Resident Engineer or Contractor personnel.

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.

THE FOLLOWING IS ADDED

Emergency Towing Service will be measured by the number of hours at the project site.

617.17 Basis of Payment.

DELETE THE FOLLOWING PAY ITEM:

<i>Pay Item</i>	<i>Pay Unit</i>
REMOVABLE PAVEMENT MARKING TAPE	LINEAR FOOT

ADD THE FOLLOWING PAY ITEMS:

<i>Pay Item</i>	<i>Pay Unit</i>
REMOVABLE WET WEATHER PAVEMENT MARKING TAPE	LINEAR FOOT
EMERGENCY TOWING SERVICE	HOURS

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 foot 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.

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 °F onto thoroughly dry surfaces. The material shall only be placed during anticipated dry weather when the ambient temperature is a minimum of 45 °F and the surface temperature is a minimum of 50 °F. 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 °F, to thoroughly dry surfaces and during anticipated dry weather, when the ambient and surface temperatures are a minimum of 50 °F. 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 foot 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	Yellow
	(Millicandelas per square foot per footcandle)	(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:

<i>Pay Item</i>	<i>Pay Unit</i>
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.

DIVISION 700 – ELECTRICAL

THE FOLLOWING IS ADDED AFTER SECTION 706:

SECTION 707 – RELOCATE UNDERGROUND TELEPHONE AND ELECTRIC SERVICE CONNECTIONS

707.01 Description.

This work shall consist of removal of existing underground telephone and electric service connections to an Emergency Call Box located in the parking lot of West Windsor Parking Authority at the Princeton Junction train station and relocating the facilities, in kind, to a new utility pole . The Emergency Call Box shall remain in service and functional at all times, except for the time required to make the final exchange from the existing telephone and electrical lines to the newly relocated telephone and electrical lines.

707.02 Materials and Equipment.

Contractor shall identify materials (i.e. wires, conduit, parts and hardware) for the existing underground telephone and electrical service connections and shall match in kind these materials for use in the relocated underground telephone and electrical service connection. Existing electrical service is provided through 122/240 volt, 3 wire, single phase service.

707.03 Construction Requirements.

The existing utility pole (#61400WW) at Alexander Road Sta. 28+50, Left is to be removed by the utility company and the proposed utility pole at Alexander Road Sta. 28+00, Left is to be set by the utility company. Contractor shall relocate the underground telephone and electric service connections to the Emergency Call Box from the existing pole at Sta. 28+50 to the proposed pole at Sta. 28+00.

Contractor shall minimize the time which is required for the emergency call box to be out of service by installing relocated conduit and new telephone and electrical wires prior to disconnecting the existing service connections. The call box shall not be out of service for more than 8 hours. During that time, the call box shall not be left unattended. The call box shall not be out of service during nighttime hours.

Upon completion of establishing the new service connections to the Emergency Call Box, Contractor shall remove the existing facilities and related materials and backfill pavement and/or soil to previous condition.

The contractor shall test verify the proper operation of the call box to the satisfaction of the Engineer.

707.04 Method of Measurement.

Payment for relocation of underground telephone and electric service will not be measured, and payment will be made on a lump sum basis and shall include all work and materials for a complete and fully operational Emergency Call Box.

707.05 Basis of Payment

Payment will be made under:

Pay Item

RELOCATE UNDERGROUND TELEPHONE AND ELECTRIC
SERVICE CONNECTIONS

Unit

LUMP SUM

Separate payment will not be made for excavation or backfilling of pavement.

Separate payment will not be made for backfilling of embankment or for seeding, fertilizing, or straw mulching.

DIVISION 800 – LANDSCAPING

SECTION 808 - FERTILIZING AND SEEDING

808.02 Materials.

THE FOLLOWING WAS ADDED:

Warm Season Grasses Seeding 909.06

808.04 Method of Measurement.

THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAPH:

Warm Season Grasses Seeding will be measured by the square yard.

808.05 Basis of Payment.

THE FOLLOWING ITEM WAS ADDED:

WARM SEASON GRASSES SEEDING	SQUARE YARD
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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:

A 10-foot work strip from the toe of slope and a 15-foot strip from the top of slope or adjacent to drainage ditches constructed under this Contract.

813.02 Materials.

THE FOLLOWING WAS ADDED:

Aluminum edging will be 1/8" x 4" cleanline aluminum with 5 stakes per 16' section. Edging will be installed with the top being flush with the finished grade.

813.06 Method of Measurement.

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

All Latin Landscaping items will be measured by the unit.

Aluminum Edging will be measured by the linear foot.

813.07 Basis of Payment.

THE FOLLOWING ITEMS WERE ADDED:

CORNUS MAS, B&B, 6'-7' HIGH	UNIT
CRATAEGUS PHAENOPYRUM MULTI-STEM, B&B, 14'-16' HIGH	UNIT
NYSSA SYLVATICA, B&B, 3 1/2" CALIPER, 10'-12' HIGH	UNIT
CRYPTOMERIA JAPONICA 'YOSHINO', B&B, 3 1/2" CALIPER	UNIT
MAGNOLIA VIRGINIANA, B&B, 8'-10' HIGH	UNIT
PINUS STOBUS 'FASTIGATA', B&B, 3 1/2" CALIPER	UNIT
ABELIA MOSANENSIS, #3 CONTAINER	UNIT
VIBURNUM TRILOBUM 'BAILEY COMPACTA', #3 CONTAINER, 18"-24"	UNIT
LIRIOPE MUSCARI 'BIG BLUE', #2 CONTAINER	UNIT
LIRIOPE MUSCARI 'VARIEGATA', #2 CONTAINER	UNIT
QUERCUS ALBA, WHITE OAK, B&B, 3 1/2" CALIPER	UNIT
LIRIODENDRON TULIPIFERA, TULIPTREE, B&B, 3 1/2" CALIPER	UNIT
ALUMINUM EDGING	LINEAR FOOT

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 Cement 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>

THE FOLLOWING SUBSECTION IS ADDED:

902.07 Coating System.

The steel components of the Beam Guide Rail shall be coated with a polyester powder over organic zinc rich epoxy, color with a color matching or similar to color chip 20059 of the Federal Standard 595B Colors (July 1995). Samples of the color shall be submitted to the State for approval. The steel shall go to the coater completely fabricated ready to be blasted and coated (free of materials such as chromates and chlorides). Welds shall be ground smooth and all weld splatter removed. The Material shall also be free of burrs, pits, or other surface imperfections.

The fabricated steel shall be grit-blasted in conformance with SSPC-10 to surface condition near white. The cleaned surface shall be protected from high humidity, rainfall, or other surface moisture, and shall be allowed to flash rust.

The epoxy zinc rich primer shall be applied to a minimum 3 mils and fully cured so that all solvents in the primer are removed prior to powder application.

The polyester powder shall be applied over the cured organic zinc electrostatically. The polyester powder thickness after cure shall be 6 mils +/- 2 mils. The total thickness of the coating shall be 7 to 12 mils.

The coating thickness shall be checked with a properly calibrated magnetic gauge. Posts requiring limited repair shall be touched up with a liquid touch-up to match the polyester powder topcoat. At the job site during installation, the utmost care shall be taken to prevent damage to the coating.

The coating procedure is as follows:

1. POLYESTER POWDER COATING OVER HOT-DIPPED GALVANIZED STRUCTURAL STEEL

Hot-dipped galvanized parts should be sent to the coater without passivation (no dichromate or quenched top layers).

- a. Brush blast parts (SP-7) to remove oxidation and soils using steel grit.
- b. Preheat parts to 150-250 degrees Fahrenheit.
- c. Apply polyester powder (per fed std 595B) to 4-10 mils.
- d. Fully cure per manufacturers recommendations.
- e. Package for shipment.

Above process will have pinholes in the coating due to gases coming off the galvanizing as the part is heated to achieve cure. Parts with this condition have been in service for ten years and still have satisfactory adhesion. Irregular surface conditions caused by the galvanizing shall be the responsibility of the galvanized. Galvanizing must be able to withstand (SP-7) blast without lifting and have an additional mil of zinc above the required specification to accommodate and removal during blast.

SECTION 903 – HOT MIX ASPHALT

903.01 Composition of Mixtures.

For this Project, the 25 percent or less RAP requirements shall govern.

For this Project, the 26 to 50 percent 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 °F 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.

<http://www.state.nj.us/transportation/cpm/BaselineDocuments/>

SECTION 905 - CONCRETE ADMIXTURES AND CURING MATERIALS

905.02 Chemical Admixtures.

THE FOLLOWING IS ADDED:

Corrosion inhibitor products that are to be used in the fabrication of concrete items shall be as follows:

Calcium Nitrite Based as produced by
W.R. Grace & Company
2133 85th Street
North Bergen, NJ 07047
Telephone: 201-869-5220

Calcium Nitrite Based as produced by
The Euclid Chemical Company
5 Joanna Court
East Brunswick, NJ 08816
Telephone: 732-390-9770

Calcium Nitrite Based as produced by
Master Builders Inc.
798 Welsh Road
Huntingdon Valley, PA 19006
Telephone: 215-938-7501

Calcium Nitrite Based as produced by
SIKA Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Telephone: 800 - 933 - SIKA (7452)

Calcium Nitrite Based as produced by
Great Eastern Technologies, LLC
"Chem Strong CI"
515 Route 528
P. O. Box 3015
Lakewood, NJ 08701
Telephone: 888 - 452 - 9348

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

Dry 0.95 – 0.99

Wet 1.39 – 1.42

Dynamic coefficient of friction

Dry 0.91 – 0.95

Wet 1.27 – 1.36

The Detectable Warning Surfaces shall be installed according to the manufacturer's recommendations.

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, 400°F	D 2669	3,000 – 10,000 cp
Cone Penetration, 77°F	D 5329	60-100
Flow, 140°F	D 5329	1/4 inch maximum
Resilience, 77°F	D 5329	30% minimum
Ductility, 77°F	D 113	1 foot minimum
Ductility, 39.2°F	D 113	1 foot minimum

Tensile Adhesion, 77°F	D 5329	500% minimum
Softening Point	D 36	170°F 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

909.06 Seed Mixtures.

THE FOLLOWING IS ADDED AFTER THE TABLE FOR TYPE F GRASS SEED MIXTURE:

Warm Season Grasses Seed. Warm Season Grasses Seed shall be as follows:

Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

Determine if a single grass species or mixture of two or more grass species is required. Add specific cultivars to each grass species if required. Consult university cooperative extension service or county extension agency for current recommendations.

For steep slope near Amtrak line behind guiderail, use sheep or hard fescue.

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 910 - MASONRY UNITS

910.07 Granite Facing for Pier Shafts.

THE LAST SENTENCE OF THE LAST PARAGRAPH IS CHANGED TO:

The number of cores to be furnished for such tests shall be six.

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
White Pigment.....	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 retroreflectance values conforming to:

Dry Condition – ASTM E 1710

Entrance Angle = 88.76°

Observation Angle (Degrees)	Specific Luminance	
	White (Millicandelas per square foot per footcandle)	Yellow (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 (Degrees)	Specific Luminance	
	White (Millicandelas per square foot per footcandle)	Yellow (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.

912.17 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, MORTOR, AND GROUT

THE TITLE OF THIS SECTION IS CHANGED TO:

SECTION 914 – PORTLAND OR BLENDED HYDRAULIC CEMENT CONCRETE, MORTOR, 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:

<u>DESCRIPTION</u>	<u>UNIT</u>	<u>BASE PRICE</u>
CONCRETE IN SUPERSTRUCTURE, DECK SLABS	CY	\$460.00
CONCRETE IN SUPERSTRUCTURE, DECK SLABS, W/ CORR. INHB. ADMIXTURE	CY	\$525.00

<u>DESCRIPTION</u>	<u>UNIT</u>	<u>BASE PRICE</u>
PRESTRESSED CONCRETE SLAB BEAMS, (TYPE SII-36), 36" X 15"	LF	\$125.00
PRESTRESSED CONCRETE SLAB BEAMS, (TYPE SIII-36), 36" X 18"	LF	\$130.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BI-36), 36" X 27"	LF	\$170.00
PRESTRESSED CONCRETE SLAB BEAMS, (TYPE SIV-36), 36" X 21"	LF	\$160.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BII-36), 36" X 33"	LF	\$170.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BIII-36), 36" X 39"	LF	\$175.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BIV-36), 36" X 42"	LF	\$185.00
PRETENSIONED PRESTRESSED CONCRETE BEAMS, 45"	LF	\$155.00
PRETENSIONED PRESTRESSED CONCRETE BEAMS, 54"	LF	\$155.00
PRESTRESSED CONCRETE SLAB BEAMS, (TYPE SII-48), 48" X 15"	LF	\$160.00
PRESTRESSED CONCRETE SLAB BEAMS, (TYPE SIII-48), 48" X 18"	LF	\$135.00
PRETENSIONED PRESTRESSED CONCRETE BEAMS, 63"	LF	\$185.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BI-48), 48" X 27"	LF	\$215.00
PRESTRESSED CONCRETE SLAB BEAMS, (TYPE SIV-48), 48" X 21"	LF	\$215.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BII-48), 48" X 33"	LF	\$185.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BIII-48), 48" X 39"	LF	\$220.00
PRESTRESSED CONCRETE BOX BEAMS, (TYPE BIV-48), 48" X 42"	LF	\$230.00
PRETENSIONED PRESTRESSED CONCRETE BEAMS, 72"	LF	\$200.00
PRESTRESSED CONCRETE PILES, DRIVEN	LF	\$90.00
CAST-IN-PLACE CONCRETE PILES, DRIVEN, 12" DIAMETER	LF	\$30.00
PRECAST CONCRETE PILES, DRIVEN, 12" X 12"	LF	\$90.00

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:

$$S = \sqrt{\frac{\sum (X_i - ALS)^2}{N - 1}}$$

Where: $\sum$ = Summation
 X_i = 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 and Substructure Members.

- 1. Fabrication Requirements.** For the construction of deck slabs, sidewalks, concrete railings and substructure 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 (x = visual rating of the surface after 50 cycles)	ASTM C 672	x = 3 max
Freeze-Thaw Durability (x = relative dynamic modulus of elasticity after 300 cycles)	AASHTO T 161 ASTM C 666 Proc. A	x = 80% minimum
Chloride Permeability 56 days (coulombs)	AASHTO T 277 ASTM C1202	1000 maximum
56 Day Compressive Strength (Verification Strength)	AASHTO T 22 ASTM C 39	5400 psi minimum

Performance Requirements for Substructure Protection Concrete

Performance Characteristic	Standard Test Method	Performance Required
Abrasion Resistance (x = average depth of wear)	ASTM C 944	x = 0.04 inches maximum
Freeze-Thaw Durability (x = relative dynamic modulus of elasticity after 300 cycles)	AASHTO T 161 ASTM C 666 Proc. A	x = 80% minimum
Chloride Permeability 56 days (coulombs)	AASHTO T 277 ASTM C1202	1000 maximum
56 Day Compressive Strength (Verification Strength)	AASHTO T 22 ASTM C 39	5400 psi 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.
- e. 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.

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 and parapet HPC.
- c. Acceptance testing performance measures shall consists of the following parameters:

Performance Characteristic	Standard Test Method	Performance Required
Percent Air Entrainment *	AASHTO T 152	6.0 ± 1.5 (#57 Aggregate) 6.0 ± 1.5 (#67 Aggregate) 7.0 ± 1.5 (#8 Aggregate)
Slump (inches) *		3 ± 1
Chloride Permeability ** 56 days (coulombs)	AASHTO T 277 ASTM C1202	2000 maximum
56 Day Compressive Strength *** (Retest Limit)	AASHTO T 22 ASTM C 39	4400 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.
- 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.

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.
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914.05 Tables.

TABLES 914-1, 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			
				357	467	Numbers	8
Cast-in-Place Items (continued)							
Footings for Fence Posts, Guide Rail End Treatment		B	3±1	----	----	7.5 max	8.5 max
Culverts		A	3±1	----	----	6.0±1.5	7.0±1.5
Monuments		A	3±1	----	----	7.5 max	8.5 max
Slope Protection		B	2±1	----	----	6.0±1.5	7.0±1.5
Precast Items							
Culverts		A	3±1	----	----	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	7.0±1.5
Concrete and White Concrete Barrier Curb		B	3±1	----	----	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 914-3 Mix Design Requirements

	Class of Concrete					
	A	B	S	P	P-1	P-2
Class Design Strength (28 days, psi Note 3)	4600	3700	2000	5500	6000	6500
Verification Strength (28 days, psi Note 3)	5400	4500	--	6000	6500	7000
Maximum Water/Cement Ratio (Note 2)						
lb/lb	0.443	0.488	0.577	Note 1	Note 1	Note 1
gals/bag	5.0	5.5	6.5	Note 1	Note 1	Note 1
Minimum Cement Content						
lb/cy	611	564	658	Note 1	Note 1	Note 1
Bags/cy	6.5	6.0	7.0	Note 1	Note 1	Note 1

Note 1: According to PCI Manual, except as indicated in Note 2.

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.

Table 914-4 Lot Sizes, Sampling Rates and Retest Limits

	Class of Concrete					
	A	B	S	P	P-1	P-2
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
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
Retest Limit (psi)	4400	3600	2000	5400	5900	6400
Retest Sampling Rate	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.

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).

Flourescent retroreflective sheeting shall be selected from the approved products list as provided in the Special Provisions.

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 PARAGRAPHS 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 3/8-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.

919.07 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 (Fe₂O₃).
- 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.

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:

$$R = \frac{B - A}{A} \times 100$$

A

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

THE FOLLOWING TEST METHODS ARE ADDED:

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 pounds per cubic foot) as determined by AASHTO T 19.

$$VCA_{mix} = 100 - (P_{ca} \times G_{mb} / G_{sbca})$$

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 0.2-inch 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, G_{mb} 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 hundredth of an ounce)

π = 3.1416

r = radius in inches (measure to 0.004" or 0.01 inch)

h = height in cm as determined from 4 equidistant measurements.

0.99707 = density of water @ 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 = $V_b = (b \times G_{mb})$

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 2 pound 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 $\pm$ 8 hours in an oven capable of maintaining 140 $\pm$ 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

$$P_{\text{loss}} = 100 \times (A-B) / A$$

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.

THE FOLLOWING TEST METHODS ARE ADDED:

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 2 pound 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 $\pm$ 10°F. Cool or reheat as necessary to meet the temperature tolerance.
3. Place each 2 pound batch into a clean, clear glass (Pyrex) 9 inch pie pans.
4. Place samples in an oven at 255 $\pm$ 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)	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
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	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
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 than 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.

M-6 SLUMP FLOW TEST AND VSI (VISUAL STABILITY INDEX) TEST METHOD

1. SCOPE

- 1.1 The slump flow is used to assess the horizontal free flow of Self-Consolidating Concrete (SCC) in the absence of obstructions. The test method is based on the test method for determining the slump (AASHTO T 119). The diameter of the concrete circle is a measure for the flowability of the SCC. The VSI is a visual evaluation of the segregation of the SCC during the slump flow test.

2. REFERENCED DOCUMENTS

- 2.1 *AASHTO Standards:*
- T 119, Slump of Hydraulic Cement Concrete
 - T 141, Sampling Freshly Mixed Concrete

3. SIGNIFICANCE AND USE

- 3.1 This is a simple, rapid test procedure. It can be used on site, though the size of the base plate is somewhat unwieldy and level ground is essential. The test can be used to assess the consistency of supply of mixed SCC to a site from load to load.
- 3.2 The slump cone is used in the inverted position to perform the slump flow test.

4. APPARATUS

- 4.1 *Slump Cone*—Mold in the shape of a truncated cone with the internal dimensions 8-inch diameter (200 mm) at the base, 4-inch diameter (100 mm) at the top, and a height of 12 inches (300 mm).
- 4.2 *Base Plate*—Base plate of a stiff non-absorbing material, at least 28 inches square (700 mm square), marked with a circle marking the central location for the slump cone.
- 4.2 *Small Tools*—Hand-held wood or metal float or trowel.
- 4.3 *Wheelbarrow*—Wheelbarrow or other container to hold at least 0.2 cubic feet (6 L) of SCC.
- 4.4 *Ruler*—Ruler or tape measure at least 30 inches (760 mm) long..
- 4.5 *Container*—A scoop or suitable container for filling specimen molds with self-consolidating concrete.

Note 1—Experience has shown pails and plastic cylinder molds to be suitable containers.

5. PROCEDURE

- 5.1 Sample the freshly mixed self-consolidating concrete in accordance with AASHTO T 141.
- 5.2 Observe the SCC in the wheelbarrow for segregation.
- 5.3 Moisten the base plate and inside of slump cone.
- 5.4 Place base plate on level stable ground. Place the inverted slump cone centrally on the base plate and hold down firmly.
- 5.5 Fill the cone with the scoop or other suitable container in one lift. Do not tamp, rod, or vibrate. Strike off the SCC level with the cone with the trowel.
- 5.6 Remove any surplus SCC from the base plate around the cone.
- 5.7 Raise the cone vertically and allow the SCC to flow out freely.
- 5.8 Measure the final diameter of the SCC in two perpendicular directions.
- 5.9 Calculate the average of the two measured diameters (this is the slump flow in inches).
- 5.10 Rate the stability of the mixture in 0.5 increments by visual examination using the following guidelines:

Table 1—Visual Stability Index (VSI) Rating Criteria

Rating	Criteria
0	No evidence of segregation in slump flow patty or in the wheelbarrow.
1	No mortar halo or aggregate pile in the slump flow patty but some slight bleed or air popping on the surface of the concrete in the wheelbarrow.
2	A slight mortar halo (< 10mm) (3/8 inch) and/or aggregate pile in the slump flow patty and highly noticeable bleeding in the wheelbarrow.
3	Clearly segregating by evidence of a large mortar halo (> 10mm) (3/8 inch) and/or large aggregate pile in the center of the concrete patty and a thick layer or paste on the surface of the resting concrete in the wheelbarrow.

6. REPORT

- 6.1 Report the identification number,
- 6.2 Location of concrete represented,
- 6.3 Date and time of molding,
- 6.4 Slump flow in inches,
- 6.4 VSI rating, and
- 6.5 Results of any other tests on the fresh concrete.

M- 7 STATIC SEGREGATION OF HARDENED SELF-CONSOLIDATING CONCRETE CYLINDERS

1. SCOPE

- 1.1 This method covers procedures for determining the static segregation resistance (stability) of self-consolidating concrete (SCC) using hardened test specimens.
- 1.2 The concrete used to make the molded specimens shall be sampled after all on-site adjustments have been made to the mixture proportions, including the addition of mix water and admixtures.

2. REFERENCED DOCUMENTS

2.1 AASHTO Standards:

- M 205, Molds for Forming Concrete Test Cylinders Vertically
- T 22, Compressive Strength of Cylindrical Concrete Specimens
- T 141, Sampling Freshly Mixed Concrete

3. SIGNIFICANCE AND USE

- 3.1 This method provides a visual assessment of static segregation resistance of self-consolidating concrete using a Hardened Visual Stability Index (HVSI) rating to evaluate molded or cored hardened concrete cylinders cut lengthwise in two.

4. APPARATUS

- 4.1 *Molds, Cylinder*—100 x 200 mm (4 x 8 in.) cylinder molds for casting concrete test specimens shall conform to the requirements of AASHTO M 205.
- 4.2 *Small Tools*—Hand-held wood or metal float or trowel.
- 4.3 *Saw*—The saw shall have a diamond or silicon-carbide cutting edge and shall be capable of cutting specimens without excessive heating or shock.
- 4.4 *Container*—A suitable container for filling specimen molds with self-consolidating concrete.

Note 1—Experience has shown pails and plastic cylinder molds to be suitable containers.

5. SAMPLING CONCRETE

- 5.1 Samples of freshly mixed self-consolidating concrete used to fabricate test specimens under this standard shall be obtained in accordance with AASHTO T 141.

6. MOLDING AND CURING SPECIMENS OF FRESHLY MIXED CONCRETE

6.1 Making Specimens:

- 6.1.1 A minimum of two fresh test specimens shall be molded as near as practicable to the place where they are to be stored. If it is not practicable to mold the specimens where they will be stored, move them to the place of storage immediately after strike off. Place molds on a rigid surface free from vibration and other disturbances. The supporting surface shall be level to within 20 mm/m (0.25 in./ft).
- 6.1.2 Specimen molds shall be filled in one lift poured using a suitable container without vibration, rodding, or tapping.
- 6.1.3 Strike off the surface of the concrete level with the top of the mold using a float or trowel.

6.2 Curing

- 6.2.1 Immediately after molding and finishing, the specimens shall be capped with a plastic cylinder lid and stored for a period up to 24 h at a minimum temperature of 16 °C (60 °F).

7. PROCEDURE

- 7.1 Before subjecting the specimens to sawing, they either shall have a minimum curing period of 24 hours or shall attain a minimum compressive strength of 6200 kPa (900 psi) according to AASHTO T 22.

- 7.2 Specimens shall be sawn lengthwise down the center. If a specimen cannot be satisfactorily sawed smooth from lack of curing, then the remaining specimen(s) shall remain undisturbed for an additional minimum curing period of 24 hours before being subjected to sawing.
- 7.3 Make a visual assessment of the cut planes of the hardened concrete cylinder or core using the criteria in Table 1. The cut planes shall be wetted to facilitate visual inspection. For cores taken perpendicular to the concrete as it was originally placed, the “top” and “bottom” of the cut plane shall be oriented parallel to the direction of placement.

Table 1—Visual Stability Index of Hardened Specimens (HVSİ) Rating Criteria

Rating	Criteria
0 stable	No mortar layer at the top of the cut plane and no variance in size and percent area of coarse aggregate distribution from top to bottom.
1 stable	No mortar layer at the top of the cut plane but slight variance in size and percent area of coarse aggregate distribution from top to bottom.
2 unstable	Slight mortar layer, less than 25 mm (1 in.) tall, at the top of the cut plane and distinct variance in size and percent area of coarse aggregate distribution from top to bottom.
3 unstable	Clearly segregated as evidenced by a mortar layer greater than 25 mm (1 in.) tall and/or considerable variance in size and percent area of coarse aggregate distribution from top to bottom.

8. REPORT

- 8.1 Report the identification number,
- 8.2 Location of concrete represented,
- 8.3 Date and time of molding,
- 8.4 HVSİ rating for each hardened specimen, and
- 8.5 Results of any other tests on the fresh concrete.