DELAWARE RIVER PORT AUTHORITY

OF THE

COMMONWEALTH OF PENNSYLVANIA

AND THE

STATE OF NEW JERSEY

INVITATION TO TENDER, INFORMATION FOR BIDDERS

CONTRACTOR'S PROPOSAL

CONTRACT, BOND, AND SPECIFICATIONS

Bid No. WW-32-2018

WALT WHITMAN BRIDGE CORRIDOR REHABILITATION PA APPROACH

ADOPTED BY THE PORT AUTHORITY

PLEASE NOTE:

Delaware River Port Authority/PATCO
has revised its engineering bidding and contract documents.

Please review carefully prior to submitting a bid on this project.

THANK YOU.

DELAWARE RIVER PORT AUTHORITY
of Pennsylvania & New Jersey®

PATCO

DELAWARE RIVER PORT AUTHORITY
NON-FTA INFORMATION FOR PROSPECTIVE BIDDERS

THIS CHECKLIST IDENTIFIES SPECIFIC ITEMS THAT MUST BE INCLUDED WITH BID PROPOSAL.
Bidders are responsible for verifying, and certifying below, that each of the items listed below are submitted with their Proposal. Failure of a Bidder to submit a completed Proposal that contains each of the items listed below, by the date and time specified in this ITB, may result in the Proposal being determined non-responsive and rejected by the Authority.

- ☐ Electronic Version of Bid – Section A.8.1
- ☐ OSHA 300 Report - Section A.10.3
- ☐ Experience Modification Factor (NJ/PA/NCCI) - Section A.10.3
- ☐ Experience Modification Factor Exception Request form – Section A.16
- ☐ Bid Proposal Forms – Section B
  - ☐ Proposal for Contract - Section B.1
    - Sign and include all Bulletins
  - ☐ Surety's Consent - Section B.2
  - ☐ Schedule for Quantities, Prices and Total Bid - Section B.3
  - ☐ Bid or Proposal Bond - Section B.4
  - ☐ Certificate of Standing - Section B.5.1
  - ☐ Political Payments and/or Contributions - Section B.5.2
  - ☐ Contractor's Qualification Statement completed in entirety along with necessary attachments - Section B.5.3
    - Details of any applicable Legal Issues - page B-17
    - List of Major Construction projects in progress - page B-18
    - List of Major construction projects completed in the past five years - page B-19
    - List of construction experience and present commitments of the key individuals in your organization - page B-19
    - Financial Statements - page B-19
    - Certification as to ability to perform the contract - page B-21
- ☐ MBE/WBE forms A-199, A-200 - Section M
- ☐ Prevailing Wage/Apprenticeship - proof of certification - Section SP.4 (Unless PLA)

BIDDER CERTIFICATION

I, (printed name) _____, state that I am the (title) _____ _____ of the Bidder.

I certify that I have read and understood the information contained in and required by the ITB issued by the Delaware River Port Authority ("Authority") for the (project name) _____ _____, and that to the best of my knowledge and belief all items identified in the checklist, above, are submitted concurrently with this Bid Proposal and that all information contained herein, or in supplemental documents with this Bid Proposal, is complete, current, and true. I further acknowledge that failure to submit any of the items identified in the checklist, above, or the submission of incomplete documents or forms, may result in a determination, in the Authority's sole discretion, that this Bid Proposal is non-responsive and, furthermore, that any false, deceptive, or fraudulent statements in this Bid Proposal will result in automatic rejection of the Bid Proposal.

Dated at this _____day of _____

Name of Organization:_____

By:_____

Title:_____

NOTE: The ITB must be assembled and submitted as a complete document, in PDF format.

DELAWARE RIVER PORT AUTHORITY

Authorized by Act of Pennsylvania Legislature, July 18, 1951 and by
Act of New Jersey Legislature, June 26, 1951

ESTABLISHED JULY 17, 1952

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SECTION A. BIDDING INFORMATION AND PROPOSAL REQUIREMENTS

A.1. DEFINITIONS

A.1.1. Bidding Documents include the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, and the proposed Contract Documents including any Bulletin(s) issued prior to receipt of Bids. The Contract Documents proposed for the Work are defined in Section E.2.9.

A.1.2. All definitions set forth in the General Conditions of the Contract for Construction, or in other Contract Documents are applicable to the Bidding Documents.

A.1.3. A Bid or Proposal is a complete and properly signed proposal to do the Work for the sum stipulated therein and submitted in accordance with the Bidding Documents.

A.1.4. A Bidder is a person or entity who submits a Proposal and/or Bid.

A 1.5 A Joint Venture is a business undertaking by two or more entities to share risk and responsibility for a project.

A.2. INVITATION TO BID

A.2.1. In accordance with the Advertisement for Bid, Proposals are invited to be submitted for the performance of the Work, the designation of which is stated in the Advertisement for Bids.

A.2.2. The Authority will consider only those Bids received from parties who have expressed an interest in the Bidding Documents. Bidding Documents are not transferable to other parties for bidding purposes. Bids received from firms who have not submitted their bids through SAP Ariba will be rejected. Faxed, e-Mailed, and/or hardcopies <u>will not</u> be accepted. <u>The Ariba submission requirement is mandatory and non-waivable</u>.

As stated in the Advertisement, which is posted on the DRPA Website, the following Contracting Officer, and Single Point of Contact for this Project will be:
Karen L. Cyphers and can be contacted at klcyphers@drpa.org / 856-968-2087

A.2.3. Bids are requested on all the items stated in the Form of Proposal. The price identified in the Bid shall cover all costs of any nature incident to and growing out of the Work, including labor, material, equipment, transportation, and all else necessary to perform and complete the Work in the manner and within the time required, all incidental expenses in connection therewith, all costs on account of loss by damage or destruction of the Work, and any additional expenses for unforeseen difficulties encountered, for settlement of damages, and for replacement of defective Work and materials.

A.3. BIDDER'S REPRESENTATIONS

The Bidder shall examine carefully the Contract Documents, site of Work, and conditions affecting the Work. By submitting a Bid, the Bidder acknowledges that it has carefully examined the Contract Documents and satisfied itself as to the conditions affecting the Work, including but not

limited to transportation, disposal, handling and storage of materials; availability of labor, water, electric power, roads, and uncertainties of weather, water stages, or similar physical conditions at the site; the conformation, characteristics and conditions of the ground; and the character of the equipment and facilities needed preliminary to and during prosecution of the Work. The Bidder further acknowledges that it has satisfied itself as to the character, quality and quantity of surface and sub-surface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the Project site, including all exploratory work done by the Authority, as well as from information presented in the Contract Documents. Any failure by the Bidder to acquaint itself with the available information will not relieve the Contractor from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The Bidder is especially directed to the Contract requirements and the Contractor's responsibility for damage to property, injury to persons, and the importance of completing the Work within the time prescribed. The Authority assumes no responsibility for any conclusions or interpretations made by the Bidder on the basis of the information made available by the Authority.

A.4. PROVISION OF DRAWINGS, SPECIFICATIONS AND OTHER RELATED INFORMATION BY THE AUTHORITY

A.4.1. The Contract Drawings show the property owned by the Authority which the Authority will allow the Contractor and other contractors access to during the construction of the Work. The Contractor may use the area shown on the Contract Drawings for the receipt and storage of materials and the construction of such plant as is necessary in connection with its operations. Upon completion of the Work under this Contract, all such construction and materials shall be removed and the property restored to a condition satisfactory to the Authority. If necessary, the Contractor shall make arrangements for such additional working area or access as it may require for its operations. The cost of securing these additional Work areas shall be deemed to be incidental and included in the prices for the various items shown on the Schedule of Quantities, Prices and Total Bid (Form B.3). As such, no additional or separate payment will be made unless specifically noted and/or provided otherwise.

A.4.2. A complete description of the Work to be completed and of the requirements, provisions, and details thereof, is provided in the Bidding Documents as shown in SAP Ariba.

A.5. MISCELLANEOUS PROVISIONS

Explanation of Documents - Requests by Bidders for explanation and interpretation of the Contract Drawings, Specifications, Bidding Documents, and other Contract Documents shall be submitted, **via e-mail**, to the Contracting Officer listed in Section A.2.2. No response will be made by the Authority to inquiries received less than ten (10) business days prior to the scheduled Bid Opening. Such requests shall state the Contract Number and name of the Project. The person submitting the request will be responsible for its delivery. Any interpretation or explanation of the documents will be made only by a written Bulletin and issued through SAP Ariba. The Authority will not be bound by any formal explanation, clarification, or interpretation, oral or written, by whomsoever made, that is not incorporated into the Bulletin duly issued by the Authority.

All Bidders will acknowledge in the space provided for in the Proposal Forms the receipt of all Bulletins.

A.6. PROPOSAL FORM QUANTITIES

A.6.1. The quantities shown on the Schedule of Quantities herein are not guaranteed correct, but are approximate only, and are given only as a basis for the comparison of Bids. The Authority does not expressly, or by implication, represent that the actual amount of Work will correspond to the estimated quantities stipulated in the Schedule of Quantities, nor may the Bidder or Contractor plead misunderstanding or deception because of such estimate of quantities of the character of the Work, location, or other conditions pertaining thereto.

A.6.2. The Authority reserves the right to increase or decrease the amount of any class or portion of the Work, or to omit any of them as it may deem necessary. Such increase or decrease of the quantities given for any of the bid items shall not be considered as sufficient grounds for granting an increase in the unit prices bid except as set forth in Section E.4.10.

A.7. PREPARING BIDS

A.7.1. Bids shall be submitted on the Form of Proposal furnished by the Authority and included in the Bidding Documents.

A.7.2. The Bid Form is listed in Section 1 - Schedule of Quantities in SAP Ariba. All blank lines **must** be filled in by the Bidder. The Bid Form is also supplied, in the same section and in original format, and must be filled in, manually signed, and submitted in SAP Ariba (Envelope 2).

A.7.3. Any interlineation, alteration, or erasure must be initialed by the signer of the Bid.

A.7.4. In stating unit and lump sum prices, and where otherwise so indicated by the makeup of the Bid Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount entered in SAP Ariba shall govern. In the event of a discrepancy in "value", the Bid Form listed in SAP Ariba, will prevail.

A.7.5. The Bidder shall state in the Form of Proposal the price per unit of measure or lump sum price, in words and in figures, for each scheduled item of Work, and the Total Price for the performance of the Work, as determined by multiplying each estimated quantity by the price per unit of measure, therefore, and adding together the resulting amounts and any lump sum prices required. For the purpose of comparison of Bids received, the Total Price, correctly computed, and shown in the Bid Form will be considered to be the amount bid for the Work and the award will be made on that Total Price.

A.7.6. If, during the tabulation of Bids, the Total Price on any Bid is found to be incorrectly computed, the Authority reserves the right to make such changes as are necessary in the extended Amounts and Total Price, on the basis of the unit and lump sum prices given in words and the approximate quantities stated for the scheduled items therein.

A.7.7. Any taxes are to be included in the unit prices and the Authority will not make any separate payment of taxes should any be assessed. Bidder will make its own independent analysis of the State of New Jersey and/or Commonwealth of Pennsylvania Sales and Use Taxes and the applicability or non-applicability thereof to the materials, supplies, and services to be provided and performed under and as a part of the Contract Work.

A.7.8. The Bid shall include the legal name of the Bidder and a statement whether the Bidder is an individual, a corporation, a partnership, joint venture, or some other specified legal entity.

A.7.8.1. If the Bidder is an individual, the Bid shall be signed by him or an authorized agent designated in a current Power of Attorney attached to the proposal.

A.7.8.2. If the Bidder is a corporation, the Bid shall be signed by an authorized officer of the corporation, with corporate seal affixed. Furthermore, the Bidder shall state the name and principal Post Office address of the corporation, and the name and address of each of the principal officers of the corporation.

A.7.8.3. If the Bidder is a partnership or limited liability company, the Bid shall be signed by all partners or members, respectively, or by the individual designated in a current Power of Attorney or Operating Agreement, attached to the Bid. Furthermore, the Bidder shall state the name and Post Office address of the partnership or limited liability company, and the name and address of each of the partners or members.

A.7.8.4. If the Bidder is a Joint Venture, the agreement between the parties relating to such Joint Venture should be submitted with the Joint Venture's Bid. The Bid shall be signed by authorized signatories from each party comprising the Joint Venture, or by the managing sponsor designated in a current Power of Attorney attached to the Bid.

Separate Certificates of Standing, Political Contribution Disclosure and Certification Forms, Contractor's Qualification Statements, and Certifications as to Ability to Perform the Contract must be supplied for each party to a Joint Venture. Each party to a Joint Venture shall also submit the information required by Section A.10.3 with the Bid.

A.7.8.5. If the Bid is signed by an agent of the Bidder other than as provided above, a current Power of Attorney shall be submitted with the Bid. If requested by the Authority, the Bidder shall submit satisfactory evidence of the authority of the person signing the Bid. A Bid not properly signed may be rejected as irregular and unauthorized.

A.7.9. Before the Contract will be executed with a successful Bidder who is not a resident of the state or one of the states in which the Work is to be done, such Bidder shall

designate a proper agent(s) in the state(s) in which the Work is to be done, on whom service can be made in the event of litigation.

A.8. SUBMITTING BIDS

A.8.1. The Contractor must submit their proposals via SAP Ariba in the following fashion:

A.8.1.1. Envelope #1: Cost - In this section (envelope) within SAP Ariba, the Contractor must submit a completed copy of the Schedule of Quantities in PDF format. The Surety Forms and Bid Bond Forms must be completed and submitted in the same section, and in PDF format. The Contractor must also fill in the prices and quantities as shown on the main screen.

A.8.1.2. Envelope #2: Technical - In this section (envelope) within SAP Ariba, the completed Bid, together with all other Contract Documents, including the Bid Security, all issued Bulletins, Bidder's qualifications and certifications, Proposal Forms, Surety's Consent Forms, Bonds, and any other documents that are required to be submitted with the Bid shall be submitted via SAP Ariba. Any Bids submitted via hard copy, separate electronic forms (i.e. flash drive or CD-Rom), or via e-mail will be rejected. Only Bids received from firms who have submitted through SAP Ariba will be accepted.

A.8.1.3. Envelope #3: Vendor Political Contribution Forms - In this section (envelope) within SAP Ariba, the Contractor must submit a completed copy of the Vendor Political Contribution Forms.

A.8.2. Bids will be accepted via SAP Ariba until the date and time stated in the Advertisement for Bids and the Special Provisions, unless otherwise indicated by a Bulletin(s) duly issued by the Authority. Bids received from firms who have not submitted their bids through SAP Ariba will be rejected. Faxed, e-Mailed, and/or hardcopies will not be accepted. The Ariba submission requirement is mandatory and non-waivable.

A.8.3. The Bidder shall assume full responsibility for the proper and timely submittal of their Bid.

A.9. MODIFICATION OR WITHDRAWAL OF BIDS

A.9.1. Each Bidder agrees by submitting its Bid that a Bid may not be modified, withdrawn or canceled by the Bidder following the time and date designated for the opening of the Bids, even though Bids may not have been opened.

A.9.2. Modification of Bids shall be made in writing over the signature of the Bidder or its duly authorized representative, shall be clearly labeled as a modification of a specified Bid, and shall be so worded as not to reveal the amount of the original Bid. Modifications received after the time stipulated for opening of Bids will not be considered. Modifications received from firms who have not submitted their bids through SAP Ariba will be rejected. Faxed, e-Mailed, and/or hardcopies will not be accepted.

A.9.3. Withdrawal of a Bid shall be made via SAP Ariba. Bids may be withdrawn by the Bidder any time prior to the time set for the opening of the Bids, and a withdrawal of a Bid does not prejudice the right of the Bidder to timely file a new Bid.

A.9.4. Modified or resubmitted Bids shall be accompanied, where appropriate, by an increase in Bid Security sufficient for the Bid as modified or resubmitted.

A.10 QUALIFICATION OF BIDDERS

A.10.1. Each Bidder submitting a Bid to the Authority shall provide with its Bid, a Qualification Statement found in Section B - Bid Form (Envelope 2).

A.10.1.1 If the Bidder is a Joint Venture, each participant in such Joint Venture must submit all the information that is required for a single entity.

A.10.2. The Bidder will complete and have notarized the Certificate of Standing, found in Section B.5.1. Bid Proposal Forms, certifying whether the Bidder is currently suspended, debarred, or disqualified from doing work for any local, municipal, county, state or federal agency or instrumentality. If suspended, debarred or disqualified, Bidder will identify: 1) what agency originated the action, and what the time period for the penalty is; 2) the reason(s) for the suspension, debarment and/or disqualification; 3) the name(s) of the individuals involved (if applicable). The aforementioned debarment information shall be considered, amongst other factors, in determining whether a Bidder is a responsible Bidder. The successful Bidder shall be responsible to obtain and file with the Authority a notarized Certificate of Standing for each and every subcontractor required to be approved pursuant to Section C.4 Approvals.

A.10.2.1 If the Bidder is a Joint Venture, each participant in such Joint Venture must submit all the information that is required for a single entity.

A.10.3 The Bidder will supply with its Bid, copies of its standard OSHA 300 Reports (each Report consisting of the OSHA Form 300, Log of Work-Related Injuries and Illnesses, and OSHA Form 300A, Summary of Work-Related Injuries and Illnesses) covering each of **three (3) reporting years immediately preceding the current year** (for example, if the Bid Opening is scheduled to occur in 2019, the Bidder shall supply copies of its standard OSHA 300 Reports for years 2016, 2017, and 2018). **The Reports shall be signed and dated by the Bidder's company executive.**

In addition, the Bidder will supply with its Bid, copies of its Experience Modification Factor (EMF) ratings, for all work completed in the State of New Jersey and the Commonwealth of Pennsylvania, covering the last **three (3) EMF reporting years, immediately preceding the current year** (for example, if the Bid Opening is scheduled to occur in 2019, the Bidder shall supply copies of its current EMF rating, plus the past two (2) years). If the Bidder's domicile state is not Pennsylvania or New Jersey, the Bidder shall provide its NCCI Interstate Modification ratings for the required timeframe.

The DRPA reserves the right to request additional EMF rating information, including any supporting documentation (e.g. NJ CRIB sheets, PA Experience Rating Modification sheets, etc.), or additional reporting years, if the DRPA determines, in its sole discretion, that the materials submitted by Bidder at the time of Bid are insufficient for the DRPA to determine whether the Bidder has stringent safety and loss control procedures.

A.10.3.1 If the Bidder is a Joint Venture, each participant in such Joint Venture must submit all the information that is required for a single entity.

A.10.3.2 Minimum Requirements

The Bidder's average EMF rate for the applicable three (3) year reporting periods, as determined by DRPA, shall not exceed 1.25. An average EMF rate exceeding 1.25 at the time of Bid Opening may result in the Bidder being declared non-responsive, unless the Bidder can prove by submission of specific, verifiable documentation that they have stringent safety and loss control procedures in place to insure that work for the DRPA will be conducted at the lowest possible accident rate (Section A.10.3.2).

A.10.3.3 EMF Rating Exception Request Form

If the Bidder has an average EMF rating exceeding 1.25, or cannot provide the required EMF rating information at the time of Bid, and would like the Authority to consider its Bid, the Bidder shall complete and supply with its Bid the EMF Rating Exception Request Form (Section A.16). All exception requests will be reviewed, and approved or rejected, by the Authority in consultation with its insurance broker consultant. **Failure to provide the EMF Rating Exception Request Form with its bid may result in the Bidder being declared non-responsive.**

A.10.4 Bidders on FTA projects shall submit all required affidavits and certificates contained in section B.6.

A.10.5 Bidders shall complete and sign the Prevailing Wage/Apprenticeship questionnaire, found in Section SP.4, certifying participation in an approved Apprenticeship Program and submitted separately, if applicable.

A.11 BID SECURITY

A.11.1. No Bid will be accepted unless the Bidder furnishes bid security for the proper execution of the Contract. Each bid must be accompanied by a Bid Bond payable to the Authority for twenty-five percent (25%) of the total amount of the bid. This Bid Bond shall be prepared on the proper form, duly executed by the Bidder, as principal, and having as surety thereon a surety company authorized to do business in the State of New Jersey and/or Commonwealth of Pennsylvania, depending on the location of the Work, and approved by the Delaware River Port Authority.

A.11.2. The Authority will have the right to retain the bid security of bidders to whom an award is being considered until either (a) the Contract has been executed and appropriate bonds have been furnished, or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected.

A.12 RIGHT OF AUTHORITY TO REJECT BIDS

A.12.1. Bids which are deemed by the Authority to be incomplete, conditional, or obscure, or which contain additions not called for alterations, or irregularities of any kind, may be rejected.

A.12.2. If the Bid Prices for the several items of the Work are unbalanced in the opinion of the Chief Engineer, the Authority shall have the right, in its own best interest, to consider the Bid irregular and accordingly reject same.

A.12.3. The Authority reserves the right to waive minor irregularities, omissions, or informalities in the Bids received, to award the Contract only to a Bidder experienced in this class of work whose Bid is deemed by the Authority to be most advantageous to the public interest, and to reject any or all Bids for any reason whatsoever. The provisions of the Invitation to Bid are made for the benefit of the Authority, and no right shall be deemed to accrue to any person making a Bid by reason of the submission of any Bid hereunder, or by the waiver or non-enforcement of any provisions or requirements of the Invitation to Bid.

A.13. DISQUALIFICATION OF BIDDERS

Submission of more than one Bid from an individual, firm, partnership, corporation, joint venture, or combination thereof under the same or different names shall be cause for disqualification of the Bids submitted by said entities. Reasonable grounds for believing that any individual, firm, partnership, corporation, joint venture, or combination thereof is interested as a principal in more than one Bid for the Work contemplated may cause the rejection of all Bids submitted by such individual, firm, partnership, corporation, or combination thereof.

A.14. SURETY

The name and address of each surety must be stated in the Bid, and the surety's consent must be submitted via SAP Ariba (Envelope 1). Furthermore, each surety's consent must be accompanied by a Power of Attorney nominating, constituting and appointing the person whose signature appears on said surety's consent and Bid Bond as the true and lawful agent of the surety to execute all bonds and consent on the surety's behalf.

A.15 BID PROTEST PROCEDURES

A.15.1. Any Bidder who is aggrieved in connection with the solicitation or award of a contract may file a protest. Protests relating to cancellation of all Bids or Proposals are not permitted.

A.15.1.1. Prior to the Bid opening, a protest by a prospective Bidder must be filed and received not less than ten (10) calendar days before the scheduled bid opening.

A.15.1.2. If a protest is filed by a Proposer, the protest must also be filed within **SEVEN (7) CALENDAR DAYS** after the protesting Proposer knew or should have known of the facts giving rise to the protest. **IN NO EVENT, HOWEVER, MAY A PROTEST BE FILED LATER THAN SEVEN (7) DAYS AFTER THE DATE THE CONTRACT IS AWARDED.** The contract award date is defined as the expiration of the New Jersey's or Pennsylvania's Governor's veto period after award of the contract by the DRPA's Board of Commissioners.

A.15.1.3. Untimely protests will not be accepted and shall be disregarded.

A.15.2. Protests must be filed in writing with the General Counsel.

A.15.2.1. A protest must state all grounds upon which the protesting party asserts that the solicitation or award is improper, as well as the remedy sought by the protesting party. Issues not raised by the protesting party within the time for filing are deemed waived by the protesting party and may not be raised on appeal.

A.15.2.2. The protesting party shall submit with the protest any documents or information deemed relevant by the protesting party.

A.15.3. Upon receipt of the protest, the General Counsel shall provide copies to the Chief Executive Officer and the Chief Engineer. The Chief Engineer shall conduct an investigation into the allegations and report to the General Counsel. The DRPA is not required to conduct a hearing as part of its investigation, and the absence of a hearing shall not be a violation of the protesting party's due process rights.

A.15.4. Following a review of the Chief Engineer's report, and any other pertinent information, the General Counsel shall advise the protesting party of the Authority's recommended action.

A.15.5. In the event that the protesting party is not satisfied with the Authority's recommendations, the protesting party may, within ten (10) business days of the date of the Authority's response, file with the General Counsel a written appeal to the Operations & Maintenance Committee, setting forth the reasons for disagreement with the Authority's response and, if desired, requesting a personal appearance before the Committee.

A.15.5.1. If a personal appearance is requested, the protesting party shall appear at the next advertised, public Operations & Maintenance Committee meeting, unless otherwise directed by the Authority. These meetings are open to the public and provide for public comment. The Committee shall not be

required to conduct a hearing as part of its review, and the absence of a hearing shall not be a violation of the protesting party's due process rights.

A.15.6. Within sixty (60) days of the receipt of the protest appeal, the Committee shall, after consideration of the allegations, facts, and any materials provided by the protesting party and Authority staff, make a decision to rebid the contract or take such other action as may, in the opinion of the Committee, be appropriate, including recommending to the Board the award of the contract to the lowest responsive and responsible bidder, as determined by the Authority.

A.15.6.1. The General Counsel shall advise the protesting party in writing of the Committee's decision and, if applicable, the date on which the Contract award will be considered by the Board of Commissioners.

A.15.6.2 The action of the Operations & Maintenance Committee or, if recommended for Board approval, the non-vetoed award of the contract by the Board of Commissioners, shall constitute an exhaustion of the remedies available to a Bidder at the Authority level.

A.16. EXPERIENCE MODIFICATION RATING EXCEPTION REQUEST FORM

A.16.1. Experience Modification Factor (EMF) rating– The Bidder must have an **average EMF rate for the applicable three (3) year reporting periods, as determined by DRPA,** of 1.25 **or less**. If the Bidder has an average EMF rating exceeding 1.25, or cannot provide the required EMF rating information at the time of Bid, and would like the Authority to consider its Bid, the Bidder shall complete the below Exception Request Form. This Exception Request will be reviewed by the Authority and/or the Authority's insurance broker consultant. **If approved, suggestions may be made to revise the Bidder's safety plan, safety personnel staffing, safety training, or other safety related procedures.**

EMR Exception Request Form*

Bidder/Contractor Name:

EMF Rating(s) for applicable reporting period(s):

PA:

NJ:

Other:

Identify any other DRPA or PATCO Project(s) the Bidder/Contractor has worked on:

Is there a specific reason why the average EMF rate is over 1.25?

Is there a specific reason why the Bidder does not have an EMF rate for the applicable reporting period(s)?

Please identify Bidder's safety staffing procedures:

Please identify Bidder's safety training procedures:

*Attach additional sheets as needed and complete the attached Experience Modification Rating Exception Questionnaire and submit it along with this form.

EXPERIENCE MODIFICATION RATING EXCEPTION QUESTIONNAIRE

Bidder Name: _____

Company Type (General Contractor, Mechanical, etc.): _____

Address: _____ Telephone No.: _____

_____

_____

RESOURCES

1. Name and Title of company Safety and Health Contact: _____

   _____

2. What percent of this individual's time is spent on Safety and Health related matters? _____

3. What professional Safety and Health certifications does this individual hold (e.g., CSP, PE, CIH)?

   _____

4. How many other full-time Safety and Health representatives are employed by your company?
   _____

5. Name and Title of Site Specific Safety Representative: _____

   _____

6. What percent of this individual's time is spent on safety and health and related matters? _____

   (*Attach copy of Safety Representative's qualifications with completed questionnaire*.)

7. Does your company have a written procedure to ensure that adequate safety and health program resources, such as budget, equipment, PPE, training and manpower are **included in each project bid**?

   □ Yes □ No (check one)

   If yes, submit a copy with the completed questionnaire.

SAFETY AND HEALTH PROGRAM ELEMENTS

1. Does your company have a written safety, health, and accident prevention program (SP)? If yes, submit a copy with your completed questionnaire. □ Yes □ No

2. Does your company have a written procedure to ensure safety and health issues are preplanned into each project and work operation (e.g., job hazard analysis, checklists, etc.) If yes, attach a copy with the completed questionnaire or reference page number in the SP. □ Yes □ No Page _____

3. Does your company have a written safety and health training program? If yes, attach a copy with the completed questionnaire or reference page number in the SP. ☐ Yes ☐ No Page No._____

   If yes, does the program include the following?

   - New employee/project orientation. ☐ Yes ☐ No Page No._____
   - Weekly "toolbox" meetings. ☐ Yes ☐ No Page No._____
   - Daily job briefings. ☐ Yes ☐ No Page No._____
   - Supervisor safety training. ☐ Yes ☐ No Page No._____
   - Task Specific Training ☐ Yes ☐ No Page No._____
   - OSHA required training. ☐ Yes ☐ No Page No._____

4. Does your company have a written procedure to ensure that only employees who are qualified by training and experience are allowed to operate equipment, tools, machinery, and vehicles? If yes, attach a copy with the completed questionnaire or reference page number in the SP. ☐ Yes ☐ No Page No._____

5. Does your company designate and train competent people as required by the applicable OSHA standards (e.g., excavations, scaffold, erection, etc.)? ☐ Yes ☐ No Page No._____

6. Does your company have a written procedure to audit projects to ensure all projects are in compliance with applicable laws, requirements, etc.? If yes, attach a copy with the completed questionnaire or reference page number in the SP. ☐ Yes ☐ No Page No._____

7. Does your company have a written procedure to screen subcontractors based on their past safety performance? If yes, attach a copy with the completed questionnaire or reference page number in the SP. ☐ Yes ☐ No Page No._____

OSHA CITATIONS

1. Has your company received any **Federal or State Plan** OSHA citations within the last 3 years? ☐ Yes ☐ No

2. If the answer to question 1 is yes, how many of each of the following types of citations have you received?

   - Willful ___
   - Imminent danger ___
   - Serious ___
   - Other than serious ___
   - De minimus ___

Give a brief description of the nature of the citation(s), or attach a copy of the citation(s).

_____

_____

_____

_____

_____

_____

ACCIDENT AND ILLNESS STATISTICS

1. How many manhours has your company worked in each of the last 3 years immediately preceding the current year? _____

2. How many OSHA recordable injuries did your company experience in each of the last 3 years immediately preceding the current year? _____

3. Based on the below listed Formula (a), what are your incident rates for each of the last 3 years immediately preceding the current year? If the rates are above the current national average the bid may be disqualified. _____

4. How many lost time accidents has your company experienced in each of the last 3 years immediately preceding the current year? _____

5. Based on the below listed Formula (b), what is your lost workday case rate for each of the last 3 years immediately preceding the current year? If the rates are above the current national average, the bid may be disqualified. _____

6. How many fatalities has your company experienced in each of the last 3 years immediately preceding the current year? _____

7. Attach a copy of your OSHA 200 logs for the last 3 years immediately preceding the current year with your completed questionnaire. _____

Formulas:

(a) $\frac{\text{Number of injuries and illnesses x 200,000}}{\text{Man-hours worked}}$

(b) $\frac{\text{Number of lost time injuries and illnesses x 200,000}}{\text{Man-hours worked}}$

WORKERS' COMPENSATION EXPERIENCE MODIFICATION RATE

Attach, on your insurance company letterhead, your Workers' Compensation EMF rates for each of the last 3 years, **immediately preceding the current year,** with your completed questionnaire.

ADDITIONAL INFORMATION

Is there any additional information you feel we need to properly evaluate your company's Safety and Health program? If yes, please explain below or attach additional sheets.

_____

_____

_____

Name of Person Completing Questionnaire (Please Print): _____

Title: _____

Signature of Person Completing Questionnaire: _____

Date: _____

SECTION B. BID PROPOSAL FORMS

B.1. PROPOSAL FOR CONTRACT

To the Delaware River Port Authority of the Commonwealth of Pennsylvania and the State of New Jersey:

The undersigned*:

_____

_____

if this Bid is accepted, does hereby agree to enter into a Contract, in the form attached hereto, and said form, when duly executed by the parties, shall constitute the Contract with the Delaware River Port Authority at the prices given in the Schedule of Quantities, Prices and Total Bid.

The undersigned bidder declares that it has carefully examined the sites of the Work described herein; has become familiar with the local conditions and the character and extent of the Work; has carefully examined the Plans and Specifications governing the Work; the Information for Bidders and Invitation to bid, the Proposal Forms, the Form of Contract, and the Form of Bonds; and thoroughly understands their stipulations, requirements and provisions.

The cost of any work performed, materials furnished, services provided or expenses incurred for work called for in the Contract Documents but for which no special pay item has been provided for in the Schedule of Quantities, Prices and Total Bid, all shall be deemed to have been included in the prices bid for the various items in the Bid.

If this Bid is accepted, the undersigned will, within ten (10) days after delivery of notice from the Authority, appear at the Contracts Administration office of the Authority, in person or by duly authorized representative, and will then and there deliver the Contract to the Authority in the form aforesaid, duly executed, and with its execution duly proved, and the undersigned will, at the same time, deliver to the Authority in accordance with the terms of said Contract, a Labor and Material Payment Bond and a Performance Bond, each in the sum of one hundred percent (100%) of the amount of the Contract, in the forms specified in Section D hereof with the following named sureties, or, if these sureties be not approved by the Authority, with such other sureties as the Authority shall approve, and, if the undersigned shall fail to furnish such satisfactory surety, the acceptance of the Bid shall not bind the Authority to a Contract.

---

*The bidder's name and address must be inserted here. In the case of an individual, the name and address of the individual, and any authorized agent designated in a current Power of Attorney attached to the Bid must be provided. In the case of a partnership or limited liability company, the name and address of each and every partner or member must be inserted. In the case of a corporation, the complete legal name and address of such corporation and the State where incorporated must be written here, together with the names, addresses and titles of the principal officers of the corporation, together with the names and addresses of the officers of the corporation who are authorized to act on behalf of such corporation. In the case of a joint venture, the names and addresses of all the joint ventures, and that of any managing sponsor designated in a current Power of Attorney attached to the Bid shall be provided.

_____

_____

(Insert here name of Surety or Sureties)

If this Bid shall be accepted by the Authority and the bidder shall refuse or neglect, within ten (10) days after due notice that the Contract has been awarded to him, to execute the same and furnish the Labor and Material Payment Bond and the Performance Bond required, with sureties satisfactory to the Authority, then the Bid Bond accompanying this Bid shall be forfeited and retained by the Authority as liquidated damages and shall be paid into the funds of the Authority.

The Authority or the Engineer may cause any notice and return of certified checks and bid bonds intended for the undersigned to be delivered or sent, postpaid, by mail to:

_____

_____

_____

_____

Acknowledgment is hereby made of the receipt of Bulletins as follows: (If none received, please write in "none")

_____

_____

The undersigned states that there are no persons interested as principals in this Bid other than those named herein.

This Bid is made without any connection with any other person making a Bid for the same purpose and is, in all respects, fair and without collusion or fraud.

_____	_____
(Bidder's Name, if a Corporation)	(Bidder's Name, if an Individual, partnership, or limited liability company)
By: _____	By: _____(L.S.)
President	
Attest: _____	
Secretary	
(Corporate Seal)	
	Date: _____

B.2. SURETY'S CONSENT

That for and in consideration of the sum of One Dollar ($1.00), lawful money of the United States, paid the undersigned corporation and for other valuable consideration, the receipt whereof is hereby acknowledged, the

_____

_____

_____

consents and agrees that, if the Contract for which the preceding Bid is made be awarded to

_____

_____

_____

_____

this Company will become bound as surety for its faithful performance, and will execute the Labor and Material Payment Bond and the Performance Bond specified in Section D hereof, and if the said

_____

_____

_____

shall omit or refuse to execute such Contract within ten (10) days from the time notified so to do, then the undersigned corporation will pay, without proof of notice, on demand, to the said Delaware River Port Authority, any difference between the sum which the next higher bidder, or the person, persons or corporation to whom the Contract shall be finally awarded, would be entitled to receive upon such completion and the amount of the foregoing Bid, the amount of said difference to be calculated upon the estimated amount of work by which the bids are tested.

If more than one surety executes this consent, each such corporation shall become bound, jointly and severally, by the terms thereof.

IN WITNESS WHEREOF, the undersigned corporation has caused this agreement to be signed by its proper officers and its corporate seal to be hereto affixed this _____ day of _____, 20___.

NOTE: The surety must sign below and state its place of business or residence:

_____

_____

_____

_____

(Attach acknowledgment and statement of surety or sureties here.)

B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
1	1 LS	MOBILIZATION AND CLEAN UP at_____ _____ per lump sum	$		$	
2	1 LS	ENGINEER'S FIELD OFFICE at_____ _____ per lump sum	$		$	
3	1 LS	FIELD SURVEY AND ENGINEERING at_____ _____ per lump sum	$		$	
4	1 LS	COORDINATION OF ELECTRICAL UTILITIES at_____ _____ per lump sum	$		$	
5	1 LS	CLEARING AND GRUBBING at_____ _____ per lump sum	$		$	
6	1 LS	MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
7	1 LS	TOW TRUCKS at_____ _____ per lump sum	$		$	
8	30 EA	TEMPORARY INLET GRATE at_____ _____ per each	$		$	
9		NOT USED				
10	157,848 SY	MILLING OF BITUMINOUS PAVEMENT SURFACE, 2" DEPTH, MILLED MATERIAL RETAINED BY CONTRACTOR at_____ _____ per square yard	$		$	
11		NOT USED				
12	53,542 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, 2" DEPTH, SRL-E at_____ _____ per square yard	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
13	131,858 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, 2" DEPTH, SRL-E at_____ _____ per square yard	$		$	
14	17,186 TON	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE (LEVELING), PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, SRL-E at_____ _____ per ton	$		$	
15	27,552 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 25.0 MM MIX, 3" DEPTH at_____ _____ per square yard	$		$	
16	27,552 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 37.5 MM MIX, 8" DEPTH at_____ _____ per square yard	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
17	20,120 SY	SUBBASE 6" DEPTH (NO. 2A) at_____ _____ per square yard	$		$	
18	8,296 SY	SUBBASE 11" DEPTH (NO. 2A) at_____ _____ per square yard	$		$	
19	266,456 SY	BITUMINOUS TACK COAT at_____ _____ per square yard	$		$	
20	1,386 SY	CEMENT CONCRETE SIDEWALK, 4" DEPTH at_____ _____ per square yard	$		$	
21	33,573 LF	BITUMINOUS SHOULDER RUMBLE STRIPS at_____ _____ per linear foot	$		$	
22	836 CY	NO. 57 COARSE AGGREGATE at_____ _____ per cubic yard			$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
23	PDA	DUST CONTROL PERMIT at Five Thousand Dollars pre-determined amount	$5,000	00	$5,000	00
24	31,192 CY	CLASS 1 EXCAVATION at_____ _____ per cubic yard	$		$	
25	20,691 CY	CLASS 1B EXCAVATION at_____ _____ per cubic yard	$		$	
26	279 CY	CLASS 2 EXCAVATION at_____ _____ per cubic yard	$		$	
27	1,280 CY	CLASS 4 EXCAVATION at_____ _____ per cubic yard	$		$	
28	6,823 CY	TOPSOIL, FURNISHED AND PLACED at_____ _____ per cubic yard	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
29	12,324 CY	FOREIGN BORROW EXCAVATION at_____ _____ per cubic yard	$		$	
30	12,324 CY	COMMON BORROW EXCAVATION at_____ _____ per cubic yard	$		$	
31	224 CY	SOIL AMENDMENT at_____ _____ per cubic yard	$		$	
32-38		NOT USED				
39	23,945 LF	PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB - 4" CONCRETE CURB at_____ _____ per linear foot	$		$	
40	555 LF	PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB - 8" CONCRETE CURB at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
41	54 EA	CURB TRANSITION FROM 4" CONCRETE CURB TO 8" CONCRETE CURB at_____ _____ per each	$		$	
42	17 EA	CURB END TERMINAL at_____ _____ per each	$		$	
43	16 LF	DEPRESSED CURB at_____ _____ per linear foot	$		$	
44-51		NOT USED				
52	50 LF	50” CONCRETE GLARE SCREEN at_____ _____ per linear foot	$		$	
53	398 LF	50" ASYMMETRICAL CONCRETE GLARE SCREEN at_____ _____ per linear foot	$		$	
54	2 EA	TRANSITION FROM EXISTING CONCRETE GLARE SCREEN TO 50" CONCRETE GLARE SCREEN at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
55		NOT USED				
56	1 EA	TRANSITION FROM 50" CONCRETE GLARE SCREEN TO ASYMMETRICAL CONCRETE GLARE SCREEN at_____ _____ per each	$		$	
57	1 EA	TRANSITION FROM 50" CONCRETE GLARE SCREEN TO CONCRETE MEDIAN BARRIER at_____ _____ per each	$		$	
58	1 EA	TRANSITION FROM EXISTING CONCRETE GLARE SCREEN TO ASYMMETRICAL CONCRETE GLARE SCREEN at_____ _____ per each	$		$	
59	1 EA	TRANSITION FROM ASYMMETRICAL CONCRETE GLARE SCREEN TO DUAL SINGLE FACED BARRIER at_____ _____ per each	$		$	
60	124 LF	CONCRETE MEDIAN BARRIER at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
61	1 EA	END TRANSITION, CONCRETE MEDIAN BARRIER at_____ _____ per each	$		$	
62	1,372 LF	SINGLE FACE CONCRETE BARRIER at_____ _____ per linear foot	$		$	
63	3 EA	END TRANSITION, SINGLE FACE CONCRETE BARRIER at_____ _____ per each	$		$	
64	155 LF	MODIFIED RETAINED FILL BARRIER at_____ _____ per linear foot	$		$	
65	164 EA	PADDLE GLARE SCREEN at_____ _____ per each	$		$	
66	2 EA	MODIFIED RETAINED FILL BARRIER TRANSITION at_____ _____ per each	$		$	
67-74		NOT USED				

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
75	919 LF	RIGHT-OF-WAY FENCE, TYPE 1 at_____ _____ per linear foot	$		$	
76	1 EA	VEHICULAR GATE FOR TYPE 1 RIGHT-OF-WAY FENCE at_____ _____ per each	$		$	
77-91		NOT USED				
92	18,878 LF	TYPE 31-S GUIDE RAIL at_____ _____ per linear foot	$		$	
93	275 LF	TYPE 31-SC GUIDE RAIL at_____ _____ per linear foot	$		$	
94	652 LF	TYPE 31-SCC GUIDE RAIL at_____ _____ per linear foot	$		$	
95	16,285 LF	REMOVAL OF EXISTING GUIDE RAIL (CONTRACTOR'S PROPERTY) at_____ _____ per linear foot	$		$	
96-97		NOT USED				

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
98	24 EA	TYPE 31 STRONG POST ANCHOR TERMINAL at_____ _____ per each	$		$	
99	24 EA	TERMINAL SECTION, SINGLE at_____ _____ per each	$		$	
100	23 EA	TERMINAL SECTION, BRIDGE CONNECTION at_____ _____ per each	$		$	
101	9 EA	TYPICAL AND ALTERNATE CONCRETE BRIDGE BARRIER TRANSITION WITHOUT INLET PLACEMENT at_____ _____ per each	$		$	
102	10 EA	THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION at_____ _____ per each	$		$	
103	8 EA	PERMANENT IMPACT ATTENUATING DEVICE, TYPE V (REUSABLE), TEST LEVEL 3 at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
104	13 EA	PERMANENT IMPACT ATTENUATING DEVICE, TYPE II, TEST LEVEL 3 (ENERGY ABSORBING TERMINALS TANGENT) at_____ _____ per each	$		$	
105-115		NOT USED				
116	40,411 LF	6" YELLOW WATERBORNE PAVEMENT MARKINGS at_____ _____ per linear foot	$		$	
117	50,706 LF	6" WHITE WATERBORNE PAVEMENT MARKINGS at_____ _____ per linear foot	$		$	
118	14,647 LF	8" WHITE WATERBORNE PAVEMENT MARKINGS at_____ _____ per linear foot	$		$	
119	3,022 LF	24" WHITE WATERBORNE PAVEMENT MARKINGS at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
120	2,785 LF	24" YELLOW WATERBORNE PAVEMENT MARKINGS at_____ _____ per linear foot	$		$	
121	219 EA	SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR W/B at_____ _____ per each	$		$	
122	80 EA	SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR W/R at_____ _____ per each	$		$	
123	21 EA	SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR Y/R at_____ _____ per each	$		$	
124-130		NOT USED				
131	2,041 SF	POST MOUNTED SIGNS, TYPE A at_____ _____ per square foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
132	7,834 LB	STEEL S OR W BEAM POSTS at_____ _____ per pound	$		$	
133	2,759 SF	POST MOUNTED SIGNS, TYPE B at_____ _____ per square foot	$		$	
134	409 SF	POST MOUNTED SIGNS, TYPE F at_____ _____ per square foot	$		$	
135	747 SF	STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS at_____ _____ per square foot	$		$	
136	7,102 SF	OVERHEAD SIGNAGE STRUCTURE - STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS at_____ _____ per square foot	$		$	
137-162		NOT USED				
163	18 SET	TYPE C INLET CONCRETE TOP UNIT AND GRATE at_____ _____ per set	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
164	24 SET	TYPE M INLET CONCRETE TOP UNIT AND GRATE at_____ _____ per set	$		$	
165	1 EA	ADA COMPLIANT INLET GRATE at_____ _____ per each	$		$	
166	169 SET	GRADE ADJUSTMENT OF EXISTING INLETS at_____ _____ per set	$		$	
167	1,210 LF	18" REINFORCED CONCRETE PIPE, TYPE A, 15' - 3' FILL, SHORE/TRENCH BOX, 100 YEAR DESIGN LIFE at_____ _____ per linear foot	$		$	
168	24 EA	STANDARD INLET BOX, HEIGHT </= 10' at_____ _____ per each	$		$	
169	7 EA	STANDARD DOGHOUSE INLET BOX, HEIGHT </= 10' at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
170	5 EA	REBUILT INLET BOX WITH MANHOLE TOP at_____ _____ per each	$		$	
171	16 EA	CONNECT TO EXISTING DRAINAGE STRUCTURE at_____ _____ per each	$		$	
172	18,300 LF	CLEANING EXISTING PIPE CULVERTS DIAMETERS UP TO AND INCLUDING 36" at_____ _____ per linear foot	$		$	
173	5 EA	REPAIR SEWER CONNECTION at_____ _____ per each	$		$	
174	206 EA	CLEANING DRAINAGE STRUCTURES at_____ _____ per each	$		$	
175-199		NOT USED				
200	595 LF	COMPOST FILTER SOCK, 12" DIAMETER at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
201	1,400 LF	COMPOST FILTER SOCK, 18" DIAMETER at_____ _____ per linear foot	$		$	
202	65 LF	COMPOST FILTER SOCK, 24" DIAMETER at_____ _____ per linear foot	$		$	
203	74 EA	INLET FILTER BAG FOR TYPE M INLET at_____ _____ per each	$		$	
204	236 EA	INLET FILTER BAG FOR TYPE C INLET at_____ _____ per each	$		$	
205	10 EA	PIPE/GRAVEL INLET PROTECTION FOR TYPE M INLET at_____ _____ per each	$		$	
206	10 EA	PIPE/GRAVEL INLET PROTECTION FOR TYPE C INLET at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
207	13,220 LF	SILT BARRIER FENCE, 18" HEIGHT at_____ _____ per linear foot	$		$	
208	1,990 LF	SILT BARRIER FENCE, 30" HEIGHT at_____ _____ per linear foot	$		$	
209	10 CY	ROCK, CLASS R-3 at_____ _____ per cubic yard	$		$	
210	168 SY	ROCK APRON at_____ _____ per square yard	$		$	
211	1005 LB	SEEDING FORMULA E at_____ _____ per pound	$		$	
212	4,874 LB	SEEDING AND SOIL SUPPLEMENTS FORMULA L at_____ _____ per pound	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
213	101,526 SY	TEMPORARY SHORT-TERM, ROLLED EROSION CONTROL PRODUCT, TYPE 2D at_____ _____ per square yard	$		$	
214	61 TON	MULCHING - STRAW at_____ _____ per ton	$		$	
215	20 EA	COMPOST SOCK WASHOUT at_____ _____ per each	$		$	
216	6 EA	PUMPED WATER FILTER BAG at_____ _____ per each	$		$	
217	6 EA	REPLACEMENT PUMPED WATER FILTER BAG at_____ _____ per each	$		$	
218	6 EA	SUMP PIT at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
219	10 EA	ROCK CONSTRUCTION ENTRANCE at_____ _____ per each	$		$	
220-230		NOT USED				
231	765 LF	AWG #2, UNDERGROUND COPPER CABLE, 1 CONDUCTOR at_____ _____ per linear foot	$		$	
232	15,636 LF	AWG #4, UNDERGROUND COPPER CABLE, 1 CONDUCTOR at_____ _____ per linear foot	$		$	
233	7,519 LF	TRENCH AND BACKFILL, TYPE I at_____ _____ per linear foot	$		$	
234	4,433 LF	TRENCH AND BACKFILL, TYPE II at_____ _____ per linear foot	$		$	
235	906 LF	HORIZONTAL BORING at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
236	2,143 LF	CONDUIT ATTACHMENT TO STRUCTURE at_____ _____ per linear foot	$		$	
237	13,045 LF	2 INCH DIRECT BURIAL CONDUIT (PVC) at_____ _____ per linear foot	$		$	
238	3,482 LF	2 INCH EXPOSED CONDUIT (RMC) at_____ _____ per linear foot	$		$	
239	47 EA	COMMUNICATIONS JUNCTION BOX, JB-11 at_____ _____ per each	$		$	
240	2,822 LF	AIR BLOWN FIBER OPTIC CABLE, 6 STRAND at_____ _____ per linear foot	$		$	
241	13,970 LF	AIR BLOWN FIBER OPTIC CABLE, 12 STRAND at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
242	14,381 LF	AIR BLOWN FIBER OPTIC CABLE, 24 STRAND at_____ _____ per linear foot	$		$	
243	1 LS	ITS SYSTEM, COMPLETE POWER SUPPLY at_____ _____ per lump sum	$		$	
244	1 LS	VARIABLE MESSAGE SIGN SYSTEM, WALK-IN at_____ _____ per lump sum	$		$	
245	1 LS	VARIABLE SPEED LIMIT SIGN SYSTEM, FRONT ACCESS at_____ _____ per lump sum	$		$	
246	1 LS	LANE USE CONTROL SIGNAL SYSTEM, FRONT ACCESS at_____ _____ per lump sum	$		$	
247	5 EA	CCTV CAMERA SYSTEM, STRUCTURE MOUNT at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
248	4 EA	ITS DEVICE FIELD ENCLOSURE, STRUCTURE MOUNT at_____ _____ per each	$		$	
249	10 EA	ITS DEVICE FIELD ENCLOSURE, GROUND MOUNT at_____ _____ per each	$		$	
250	INCIDENTAL	ITS SYSTEM TESTING (INCIDENTAL) incidental				
251	9 EA	FIBER OPTIC TERMINATION PATCH PANELS, 6-PORT at_____ _____ per each	$		$	
252	8 EA	FIBER OPTIC TERMINATION PATCH PANELS, 12-PORT at_____ _____ per each	$		$	
253	22 EA	FIBER OPTIC TERMINATION PATCH PANELS, 24-PORT at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
254	81 EA	FIBER OPTIC PATCH CABLES at_____ _____ per each	$		$	
255	1 LS	COMMUNICATION SYSTEM at_____ _____ per lump sum	$		$	
256	10 EA	ETHERNET SWITCH at_____ _____ per each	$		$	
257	10 EA	ETHERNET MEDIA CONVERTER at_____ _____ per each	$		$	
258	1 LS	ITS DEVICE SPARE PARTS at_____ _____ per lump sum	$		$	
259	1 LS	COORDINATION WITH TRI-M at_____ _____ per lump sum	$		$	
260	16 HRS	ITS SYSTEMS TRAINING at_____ _____ per hour	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
261	1,472 LF	AWG #3/0, UNDERGROUND COPPER CABLE, 1 CONDUCTOR at_____ _____ per linear foot	$		$	
262		NOT USED				
263	10 EA	JUNCTION BOX, JB-11 at_____ _____ per each	$		$	
264	10 EA	JUNCTION BOX REMOVAL at_____ _____ per each	$		$	
265	27 EA	CAST JUNCTION BOX at_____ _____ per each	$		$	
266	21 EA	LIGHTING POLE FOUNDATION, TYPE FC at_____ _____ per each	$		$	
267	21 EA	LIGHTING POLE FOUNDATION REMOVAL at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
268	58 EA	ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE S INCLUDING 113 WATT LED LUMINAIRE TYPE II DISTRIBUTION at_____ _____ per each	$		$	
269	7 EA	ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE A INCLUDING 113 WATT LED LUMINAIRE TYPE II DISTRIBUTION at_____ _____ per each	$		$	
270	102 EA	ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE S INCLUDING 113 WATT LED LUMINAIRE TYPE III DISTRIBUTION at_____ _____ per each	$		$	
271	58 EA	ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE A INCLUDING 113 WATT LED LUMINAIRE TYPE III DISTRIBUTION at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
272	2,048 LF	2" DIRECT BURIAL LIGHTING CONDUIT at_____ _____ per linear foot	$		$	
273	1,466 LF	2" PVC COATED RIGID STEEL CONDUIT at_____ _____ per linear foot	$		$	
274	1 EA	LIGHTING POLE REMOVAL at_____ _____ per each	$		$	
275	1 LS	COMPLETE POWER SUPPLY SYSTEM WITH 12" SKIRT, AM-3A at_____ _____ per lump sum	$		$	
276	70,215 LF	AWG #6, UNDERGROUND COPPER CABLE, 1 CONDUCTOR at_____ _____ per linear foot	$		$	
277	132,933 LF	AWG #8, UNDERGROUND COPPER CABLE, 1 CONDUCTOR at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
278	4 EA	COMPLETE POWER SUPPLY SYSTEM WITH 12" SKIRT at_____ _____ per each	$		$	
279	5 EA	SCADA CONTROLLER CABINET at_____ _____ per each	$		$	
280	5 EA	TESTING OF ENTIRE POWER SUPPLY SYSTEM AND CONNECTIONS at_____ _____ per each	$		$	
281	5 EA	TESTING OF ENTIRE LIGHTING SYSTEM at_____ _____ per each	$		$	
282	5 EA	TESTING OF SCADA SYSTEM at_____ _____ per each	$		$	
283	21 EA	LED PEDESTRIAN TUNNEL LUMINAIRE at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
284	1 LS	SIGN LIGHTING 2 LED LUMINAIRES, STRUCTURE S-1 at_____ _____ per lump sum	$		$	
285	1 LS	SIGN LIGHTING 2 LED LUMINAIRES, CSX TUNNEL STRUCTURE at_____ _____ per lump sum	$		$	
286		NOT USED				
287	1 LS	ROADWAY TUNNEL (CSX OVERPASS) LED LUMINAIRE LIGHTING SYSTEM at_____ _____ per lump sum	$		$	
288	1 LS	LED 4 FLASHING CHEVRON SYSTEM at_____ _____ per lump sum	$		$	
289	1 LS	LED 12 FLASHING CHEVRON SYSTEM at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
290	12 EA	FOUNDATION TYPE SPF at_____ _____ per each	$		$	
291	12 EA	PEDESTRIAN SIGNAL STANDARD, 10 FOOT at_____ _____ per each	$		$	
292	6 EA	LED UNDERDECK COBRA HEAD LUMINAIRE at_____ _____ per each	$		$	
293	35 EA	LED UNDERDECK WALL MOUNT LUMINAIRE at_____ _____ per each	$		$	
294	15 EA	JUNCTION BOX, JB-11, NEW LID at_____ _____ per each	$		$	
295		NOT USED				
296	1 LS	SIGN LIGHTING 4 LED LUMINAIRES, STRUCTURE S-19 at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
297	1 PDA	UNFORESEEN WWB INFRASTRUCTURE REPAIR at Thirty-five Thousand Dollars pre-determined amount	$35,000	00	$35,000	00
298-312		NOT USED				
313	10,491 SY	SCARIFICATION, 1 ¾" DEPTH at_____ _____ per square yard	$		$	
314	13,501 SY	SCARIFICATION, 1" DEPTH at_____ _____ per square yard	$		$	
315	23,992 SY	CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION at_____ _____ per square yard	$		$	
316	10,491 SY	LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH at_____ _____ per square yard	$		$	
317	13,501 SY	LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH at_____ _____ per square yard	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
318	175 CY	LATEX MODIFIED CONCRETE WEARING SURFACE, VARIABLE ADDITIONAL DEPTH at_____ _____ per cubic yard	$		$	
319	7,381 SY	APPLICATION OF PENETRATING SEALER TO REINFORCED CONCRETE SUPERSTRUCTURE SURFACES at_____ _____ per square yard	$		$	
320	3,005 SY	APPLICATION OF PENETRATING SEALER TO REINFORCED CONCRETE SUBSTRUCTURE SURFACES at_____ _____ per square yard	$		$	
321	82,169 SF	APPLICATION OF ANTI-GRAFFITI COATING at_____ _____ per square foot	$		$	
322	360 SF	REINFORCED CONCRETE REPAIR – TYPE 1 at_____ _____ per square foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
323	2,038 SF	REINFORCED CONCRETE REPAIR – TYPE 2 at_____ _____ per square foot	$		$	
324	27 SF	REINFORCED CONCRETE REPAIR – TYPE 3 at_____ _____ per square foot	$		$	
325	37 LF	EPOXY INJECTION CRACK REPAIR at_____ _____ per linear foot	$		$	
326	1,083 LF	REPLACE NEOPRENE STRIP SEAL GLAND at_____ _____ per linear foot	$		$	
327	324 LF	REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS at_____ _____ per linear foot	$		$	
328	361 LF	REPLACE NEOPRENE STRIP SEAL EXPANSION DAM at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
329	134 LF	REPLACE TOOTH EXPANSION JOINT WITH MODULAR EXPANSION JOINT at_____ _____ per linear foot	$		$	
330	149 LF	LONGITUDINAL JOINT SEALING, BRIDGE DECK at_____ _____ per linear foot	$		$	
331	687 LF	LONGITUDINAL JOINT SEALING, SPLIT GLARE SCREEN MEDIAN BARRIER at_____ _____ per linear foot	$		$	
332	2,423 LF	JOINT SEALING, SUBSTRUCTURE at_____ _____ per linear foot	$		$	
333	657 LF	SUBSTRUCTURE MORTAR REPOINTING at_____ _____ per linear foot	$		$	
334	1 LS	RECONSTRUCT CHEEKWALL at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
335	1,225 SF	GRANITE BLOCK SLOPE WALL REPAIR at_____ _____ per square foot	$		$	
336	6,911 LF	GRANITE BLOCK SLOPE WALL MORTAR REPAIR at_____ _____ per linear foot	$		$	
337	402 SY	SLOPE WALL EDGE CONSTRUCTION at_____ _____ per square yard	$		$	
338	1 LS	CLEAN DRAINAGE SYSTEM at_____ _____ per lump sum	$		$	
339	1 LS	CLEAN DRAINAGE SYSTEM, CSX RAILROAD OVERPASS at_____ _____ per lump sum	$		$	
340	5 EA	MODIFY DRAINAGE SYSTEM at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
341	1 LS	REPLACE ROOF DRAIN, CSX RAILROAD OVERPASS at_____ _____ per lump sum	$		$	
342	1 LS	REPLACE FLOOR DRAIN DOWNSPOUT, RANDOLPH STREET OVERPASS at_____ _____ per lump sum	$		$	
343	2 EA	REPAIR DRAINAGE SYSTEM at_____ _____ per each	$		$	
344	170 CY	DEBRIS REMOVAL at_____ _____ per cubic yard	$		$	
345	1 LS	JACKING BRIDGE SUPERSTRUCTURE – RANDOLPH STREET at_____ _____ per lump sum	$		$	
346	1 LS	JACKING BRIDGE SUPERSTRUCTURE – SEVENTH STREET at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
347	1 LS	JACKING BRIDGE SUPERSTRUCTURE – TENTH STREET at_____ _____ per lump sum	$		$	
348	1 LS	JACKING BRIDGE SUPERSTRUCTURE – BROAD STREET at_____ _____ per lump sum	$		$	
349	1 LS	JACKING BRIDGE SUPERSTRUCTURE – RAMP K-L at_____ _____ per lump sum	$		$	
350	1 LS	JACKING BRIDGE SUPERSTRUCTURE – RAMP M at_____ _____ per lump sum	$		$	
351	1 LS	JACKING BRIDGE SUPERSTRUCTURE – EB OVER MOYAMENSING at_____ _____ per lump sum	$		$	
352	1 LS	JACKING BRIDGE SUPERSTRUCTURE – WB OVER MOYAMENSING at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
353	1 LS	JACKING BRIDGE SUPERSTRUCTURE – EB OVER PASSYUNK at_____ _____ per lump sum	$		$	
354	251 EA	BEARING REHABILITATION – TYPE 1 at_____ _____ per each	$		$	
355	17 EA	BEARING REHABILITATION – TYPE 2 at_____ _____ per each	$		$	
356	26 EA	BEARING REHABILITATION – TYPE 3 at_____ _____ per each	$		$	
357	2 EA	BEARING REHABILITATION – TYPE 4 at_____ _____ per each	$		$	
358	15 EA	BEARING REHABILITATION – TYPE 5 at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
359	2 EA	BEARING REHABILITATION – TYPE 6 at_____ _____ per each	$		$	
360	2 EA	BEARING REHABILITATION – TYPE 7 at_____ _____ per each	$		$	
361	8 EA	BEARING REHABILITATION – TYPE 8 at_____ _____ per each	$		$	
362	1 EA	BEARING REHABILITATION – TYPE 9 at_____ _____ per each	$		$	
363	1 EA	BEARING REHABILITATION – TYPE 10 at_____ _____ per each	$		$	
364	1 EA	BEARING REHABILITATION – TYPE 11 at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
365	1,545 SF	SPECIAL MORTAR REPAIRS at_____ _____ per square foot	$		$	
366	700 SF	REMOVE GRAFFITI at_____ _____ per square foot	$		$	
367	4 EA	FILL DRAINAGE PIPE WITH CONCRETE at_____ _____ per each	$		$	
368	2 EA	REPAIR BARRIER SLIDING PLATE CONNECTION SCREWS at_____ _____ per each	$		$	
369	483 LF	JOINT SEALING, SOUND BARRIERS at_____ _____ per linear foot	$		$	
370	INCIDENTAL	SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES (INCIDENTAL) incidental				

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
371	INCIDENTAL	WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT (INCIDENTAL) incidental				
372	1 LS	WORK PLATFORMS AND PROTECTION SHIELDS at_____ _____ per lump sum	$		$	
373	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-1 (DSS-0301) at_____ _____ per lump sum	$		$	
374	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-3 (DSS-0303) at_____ _____ per lump sum	$		$	
375	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-4 (DSS-0304) at_____ _____ per lump sum	$		$	
376	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-5 (DSS-0305) at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

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ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
377	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-6 (DSS-0306) at_____ _____ per lump sum	$		$	
378	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-10 (DSS-0310) at_____ _____ per lump sum	$		$	
379	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-11 (DSS-0311) at_____ _____ per lump sum	$		$	
380	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-13 (DSS-0313) at_____ _____ per lump sum	$		$	
381	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-14 (DSS-0314) at_____ _____ per lump sum	$		$	
382	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-15 (DSS-0315) at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
383	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-16 (DSS-0316) at_____ _____ per lump sum	$		$	
384	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-17 EB (DSS-0317EB) at_____ _____ per lump sum	$		$	
385	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-17 WB (DSS-0317WB) at_____ _____ per lump sum	$		$	
386	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-18 (DSS-0318) at_____ _____ per lump sum	$		$	
387	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-19 (DSS-0319) at_____ _____ per lump sum	$		$	
388	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-20 (DSS-0320) at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
389	1 LS	STEEL SIGN STRUCTURE – MONOPIPE, S-21 (DSS-0321) at_____ _____ per lump sum	$		$	
390	1 LS	STEEL SIGN STRUCTURE – TRUSS, S-8 (DSS-0308) at_____ _____ per lump sum	$		$	
391	1 LS	STEEL SIGN STRUCTURE – TRUSS, S-9 (DSS-0309) at_____ _____ per lump sum	$		$	
392	1 LS	STEEL SIGN STRUCTURE REPAIR, S-2 (DSS-0302) at_____ _____ per lump sum	$		$	
393	1 LS	STEEL SIGN STRUCTURE REPAIR, S-23 (DSS-0323) at_____ _____ per lump sum	$		$	
394	1 LS	STEEL SIGN STRUCTURE REPAIR, S-24 (DSS-0324) at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
395	40.5 LF	DRILLED CAISSON CONSTRUCTION, 48" DIAMETER at_____ _____ per linear foot	$		$	
396	521.5 LF	DRILLED CAISSON CONSTRUCTION, 54" DIAMETER at_____ _____ per linear foot	$		$	
397	507.5 LF	DRILLED CAISSON CONSTRUCTION, 60" DIAMETER at_____ _____ per linear foot	$		$	
398	1 LS	REMOVAL OF EXISTING SIGN STRUCTURE at_____ _____ per lump sum	$		$	
399	PDA	CSX COORDINATION at One Hundred Thousand Dollars pre-determined amount	$100,000	00	$100,000	00
400	89 LF	DRILLED CAISSON CONSTRUCTION, 72" DIAMETER at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
401	1 LS	HEALTH AND SAFETY PLAN at_____ _____ per lump sum	$		$	
402	1 LS	WASTE MANAGEMENT PLAN at_____ _____ per lump sum	$		$	
403	1 LS	EXCAVATION SAMPLING, ANALYSIS AND REPORTING at_____ _____ per lump sum	$		$	
404	1 LS	WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING at_____ _____ per lump sum	$		$	
405	PDA	OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF CLEAN FILL) at Twenty-seven Thousand Dollars pre-determined amount	$27,000	00	$27,000	00
406	PDA	OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED FILL) at Eighty-two Thousand Dollars pre-determined amount	$82,000	00	$82,000	00

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
407	PDA	OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED RESIDUAL WASTE) at One Million One Hundred Twelve Thousand Dollars pre-determined amount	$1,112,000	00	$1,112,000	00
408	PDA	OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED HAZARDOUS WASTE) at One Hundred Twenty-one Thousand Dollars pre-determined amount	$121,000	00	$121,000	00
409	PDA	OFF SITE DISPOSAL, LIQUIDS, (DISPOSAL OF NON-HAZARDOUS WATER) at Thirty-three thousand Dollars pre-determined amount	$33,000	00	$33,000	00
410	PDA	OFF SITE DISPOSAL, LIQUIDS, (DISPOSAL OF HAZARDOUS WATER) at Nineteen Thousand Dollars pre-determined amount	$19,000	00	$19,000	00
411-414		NOT USED				
415	1 LS	TEMPORARY WORK PLATFORM AND PROTECTION SHIELDS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
416	1 LS	RELOCATING AND RESETTING EXISTING STRUCTURE MOUNTED SIGNS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
417	1 LS	DEMOLITION OF EXISTING SIGNAL GANTRIES – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
418	373,516 LB	SIGNAL GANTRIES – SIGNAL GANTRIES at_____ _____ per pound	$		$	
419	1 LS	SIGN AND SIGNAL MOUNTING BRACKETS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
420		NOT USED				
421	1 LS	ALUMINUM WALKWAY GRATING – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
422	INCIDENTAL	SURFACE PREPARATION AND COATING FOR STEEL – SIGNAL GANTRIES (INCIDENTAL) incidental				
423	1 LS	MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
424	1 LS	DEMOLITION OF CONDUITS FEEDING GANTRY FROM TOWERS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
425	1 LS	DEMOLITION OF CONDUITS ON GANTRIES – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
426	1 LS	DEMOLITION OF LOAD CENTER AND TRANSFORMERS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
427	1 LS	ELECTRICAL SUPPORTS AND SEISMIC RESTRAINTS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
428	1 LS	IDENTIFICATION FOR ELECTRICAL SYSTEMS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
429		NOT USED				
430	470 LF	AWG #6 CONDUCTORS – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	
431	1,610 LF	AWG #8 CONDUCTORS – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	
432	1,040 LF	AWG #10 CONDUCTORS – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
433	1 LS	MISCELLANEOUS CONDUCTORS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
434	1 LS	MISCELLANEOUS CONDUITS – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
435	2,800 LF	1-INCH RGS CONDUIT – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	
436	1,040 LF	2-INCH RGS CONDUIT – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	
437	10,205 LF	4-INCH RGS CONDUIT – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	
438		NOT USED				

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
439	1 LS	DEMOLITION LIGHTING CONTROL AND ASSOCIATED WIRING – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
440	1 LS	DEMOLITION GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
441	1 LS	DEMOLITION GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
442	23 EA	GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES at_____ _____ per each	$		$	
443	84 EA	GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES at_____ _____ per each	$		$	
444	1 LS	SPECIAL SYSTEMS DEMOLITION – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
445	2 EA	CAMERA REMOVAL-RESETTING – SIGNAL GANTRIES at_____ _____ per each	$		$	
446	12,477 LF	24 STRAND SM OUTSIDE PLANT FOC – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	
447	1 LS	TESTING FOR FIBER – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
448	1 LS	FIBER OPTIC SPLICE CASE – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
449	1 LS	FUSION SPLICING – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
450	35,298 LF	INNERDUCT – SIGNAL GANTRIES at_____ _____ per linear foot	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
451	6 EA	PANELBOARDS – SIGNAL GANTRIES at_____ _____ per each	$		$	
452	6 EA	DRY-TYPE TRANSFORMERS (600V AND LESS) – SIGNAL GANTRIES at_____ _____ per each	$		$	
453	1 LS	GROUNDING AND BONDING – SIGNAL GANTRIES at_____ _____ per lump sum	$		$	
454	INCIDENTAL	BASIC ELECTRICAL MATERIALS AND METHODS – SIGNAL GANTRIES (INCIDENTAL) incidental				
455	6 EA	VARIABLE SPEED LIMIT (VSL) SIGN – SIGNAL GANTRIES at_____ _____ per each	$		$	
456	2 EA	NETWORK SWITCH – SIGNAL GANTRIES at_____ _____ per each	$		$	

SECTION B.3. SCHEDULE OF QUANTITIES, PRICES AND TOTAL BID

CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION - PA APPROACH

ITEM NO.	APPROXIMATE QUANTITY AND UNITS	DESCRIPTION OF ITEM AND WRITTEN UNIT PRICES BID	UNIT PRICE		TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
457	PDA	SITE COORDINATION AND CONDITIONS at Three Million Dollars pre-determined amount	$3,000,000	00	$3,000,000	00
458	PDA	INCENTIVE FOR EARLY COMPLETION, STAGES 1 THROUGH 2 at Four Million Dollars pre-determined amount	$4,000,000	00	$4,000,000	00
459-480		NOT USED				
Total Amount of Bid (Price in Numbers)			**$0.00**			
Total Amount of Bid (Price in Words):						

B.4. BID OR PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned

_____
_____
_____
_____as Principal; and
_____
as Surety, are held and firmly bound unto the Delaware River Port Authority in the sum of
_____
_____
($_____) for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents. Signed and Sealed this _____ day of _____ , 20____. The condition of this obligation is such that, whereas the Principal has submitted or is about to submit to the Delaware River Port Authority a Bid for Contract No._____entitled
_____
_____
_____
_____,

Now, therefore, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing, and give bond, with surety acceptable to the Delaware River Port Authority for the faithful performance of the said contract, then this obligation shall be void, otherwise to remain in full force and effect.

_____(L.S.)
Principal

_____
Surety

By: _____
Attorney(s) in Fact

B.5. DRPA AFFIDAVITS AND CERTIFICATES

The following forms are to be completed in accordance with the various applicable Contract Provisions herein:

B.5.1 CERTIFICATE OF STANDING

The undersigned _____(insert either "IS NOT" OR "IS") suspended, debarred or disqualified from doing work for any local, municipal, county, state or federal agency or instrumentality.

If the response to the above is in the affirmative (i.e. "IS"), the following information is to be provided:

I. State the full name of the agency or instrumentality originating each suspension, debarment, or disqualification and indicate the period of such suspension, debarment or disqualification:

	NAME	FROM	TO
A.	_____		
B.	_____		
C.	_____		
D.	_____		

II. State the reasons/circumstances for each of the above listed suspensions, debarments or disqualifications:

A. _____

_____

_____

_____

B. _____

_____

_____

C. _____

_____

_____

_____

D. _____

_____

_____

III. State the name of the individual(s) involved in said suspension, debarment or disqualification. Identify his present position with your company. If such person(s) is no longer employed by you, identify all business relationships between you and/or your company and said person(s).

A. _____

_____

B. _____

_____

C. _____

_____

D. _____

_____

(If additional space is needed, use the reverse side or additional page.)

_____
Name of Company

By: _____ (Seal)

Title: _____

Attest: _____

I _____, being duly sworn according to the law depose and
(Insert Name)

say that I am _____, of _____ and
(Insert Title) (Name of Company)

that the facts contained in the foregoing Certificate of Standing are true and correct to the best of my knowledge, information and belief.

_____
Signature

Sworn to and subscribed before me this _____day of _____, 20___.

_____
Notary Public

B.5.2 POLITICAL PAYMENTS AND/OR CONTRIBUTIONS

PURPOSE: The following policy is established by the Board of Commissioners (Board) to ensure the Delaware River Port Authority (DRPA) and Port Authority Transit Corp. (PATCO) is conducting business in an open, transparent, and ethical manner. This policy pertains to all bids, proposals, quotes, and/or statements of qualifications submitted to the DRPA and PATCO.

SCOPE: Defines the circumstances under which the Authority shall be prohibited from contracting with vendors who make certain political contributions.

POLICY:

1. All current and/or prospective vendors seeking to enter into an agreement or otherwise contract to provide any material, supplies or equipment to the Authority, or to acquire, sell, or lease any land or building from the Authority, if such contract or agreement is in excess of $25,000 in value, the vendor will be required to submit a Political Contribution Disclosure Form and a Certification Form prior to the execution of an agreement or contract with the Authority. The business entity shall have a continuing duty to report any contribution it makes during the term of the contract. The political contributions to be disclosed are limited to those made on the local, county, and state levels in Pennsylvania and New Jersey.

2. If a business entity makes a contribution during the term of the contract or agreement, the entity must disclose the contribution within 30 days of the contribution. The entity will be required to disclose the candidate, date of contribution and the amount of the contribution within 30 days of contribution.

3. Definitions

   "Contribution" means a contribution which is a reportable contribution in accordance with either 25 P.S. §3241 et. seq. or N.J.S.A. 19:44A-1 et. seq., as applicable, made on or after the date hereof.

   “Business entity” means:

   i. a for-profit entity as follows:

      (a) in the case of a corporation: the corporation, any officer of the corporation, and any person or business entity that owns or controls 10% or more of the stock of the corporation;

      (b) in the case of a general partnership: the partnership itself and any partner controlling 10% or more of the partnership interest;

(c) in the case of a limited partnership: the limited partnership and any partner controlling 10% or more of the limited partnership interest;

(d) in the case of a limited liability company: the limited liability company and any member controlling 10% or more of the limited liability company;

(e) in the case of a limited liability partnership: the limited liability partnership and any partner controlling 10% or more of the limited liability partnership;

(f) in the case of a sole proprietorship: the proprietor; and

(g) in the case of any other form of entity organized under the laws of this State or any other state or foreign jurisdiction: the entity and any principal, officer, or partner thereof;

ii. any subsidiary directly or indirectly controlled by the business entity;

iii. any political organization organized under section 527 of the Internal Revenue Code that is directly or indirectly controlled by the business entity, other than a candidate committee, election fund, or political party committee; and

iv. with respect to an individual who is included within the definition of business entity, that individual's spouse or civil union partner, and any child residing with the individual, that, this policy shall not apply to a contribution made by such spouse, civil union partner, or child to a candidate for whom the contributor is entitled to vote or to a political party committee within whose jurisdiction the contributor resides unless such contribution is in violation of Section 6 of this policy.

4. It shall be a breach of the terms of any contract with the Authority for a business entity to: (i) knowingly conceal or misrepresent a contribution given or received; (ii) make or solicit contributions through intermediaries for the purpose of concealing or misrepresenting the source of the contribution; (iii) engage or employ a lobbyist or consultant with the intent or understanding that such lobbyist or consultant would make or solicit any contribution, which if made or solicited by the business entity itself, would subject that entity to the restrictions of this policy; (iv) fund contributions made by third parties, including consultants, attorneys, family members, and employees; (v) engage in any exchange or contributions to circumvent the intent of this policy, or (vi) directly or indirectly, through or by any other person or means, do any act which would subject that entity to the restrictions of this policy.

5. A business entity which is determined by the Authority to have willfully and intentionally made a contribution or failed to reveal a contribution in violation of this policy shall be barred by the Authority from contracting with the Authority for up to five years.

6. Notwithstanding anything contained herein to the contrary, nothing contained herein shall prohibit the Authority from contracting with a vendor where the Chief Executive Officer is authorized to act pursuant to the Emergency Powers provisions under the Bylaws.

7. Nothing contained in this policy shall be construed as affecting the eligibility of any business entity to perform a contract with the Authority because that entity made a contribution during the two-year period immediately preceding the effective date of this policy. This policy shall be effective as of January 1, 2011.

PROCEDURE:

Vendors are required to submit a Political Contribution Disclosure Form and a Certification Form on all bids, proposals, quotes, and/or statements of qualifications for contracts in the amount of $25,000.00 or more.

The requested forms must be submitted as shown in SAP Ariba. These forms shall not be submitted as a part of the Technical or Cost Bids.

The Political Contribution Disclosure Form and Certification Form will be forwarded to the OIG for review. OIG will determine whether the Vendor is in compliance with DRPA policy. OIG will also review the Political Contribution Disclosure Form for any potential conflict or direct conflict of interest with members of the Board. OIG will address any potential conflict or actual conflict with the Board member pursuant to OIG guidelines.

Failure to submit these forms will result in the disqualification of the Vendor's bid, proposal, quote, or statement of qualification.

POLITICAL CONTRIBUTION DISCLOSURE FORM

This form must be submitted to the DRPA, via SAP Ariba, simultaneously with the proposal or bid for, or prior to the extension or renewal of, any contract with the DRPA.

Part I – Vendor Information

Vendor Name:			
Address:			
City:		State:	Zip:

The undersigned being authorized to certify, hereby certifies that the submission provided herein represents compliance with the disclosure requirements of the Authority.

Signature _____ Printed Name_____ Title _____

Part II – Contribution Disclosure

Disclosure requirement: Disclosure must include all reportable political contributions over the past four (4) years on the form provided. **Please mark "None" or "N/A" if no contributions to be disclosed. A blank form does not constitute an acceptable submission.**

Contributor Name	Recipient Name	Date	Dollar Amount
			$

CERTIFICATION
PROHIBITION ON CONTRACTING
WITH VENDORS WHO MAKE CERTAIN POLITICAL CONTRIBUTIONS

The Proposer hereby certifies that it has not made a contribution that would bar the award of the Contract pursuant to the Prohibition on "Contracting with Vendors who Make Certain Political Contributions" Policy and shall report any contribution it makes during the term of the Contract.

Date _____

Signature _____

Company Name_____

Title_____

B.5.3. CONTRACTOR'S QUALIFICATION STATEMENT

The undersigned certifies under oath on behalf of the Contractor that the information provided herein is true and sufficiently complete so as not to be misleading. The Contractor also expressly warrants, acknowledges, represents, and agrees that the statements set forth below may be relied upon by the Authority in awarding a contract to the Contractor.

**Contractor is permitted to use separate sheet(s) of paper to fully respond to the questions set forth below.

CONTRACTOR INFORMATION:

NAME:_____

ADDRESS:_____

PRINCIPAL OFFICE:_____

EMAIL ADDRESS:_____

TELEPHONE NUMBER:_____

PROJECT NAME AND NUMBER:_____

BUSINESS ORGANIZATION:

[ ] Corporation [ ] Partnership [ ] Individual [ ] Joint Venture* [ ] Other

***In accordance with Section A.10.1.1, each participant in such Joint Venture must submit all the information that is required for a single entity.**

TYPE OF WORK PERFORMED BY CONTRACTOR:

[ ] General Construction [ ] HVAC [ ] Electrical [ ] Plumbing [ ] Other (_____)

I. HISTORY

1. How many years has your organization been in business as a Contractor?

2. How many years has your organization been in business under its present business name?

3. Under what other or former names has your organization operated?

4. If your organization is a corporation, answer the following:

    a. Date of incorporation:

    b. President's name:

    c. Vice-President's name(s):

    d. Secretary's name:

    e. Treasurer's name:

5. If your organization is a partnership, answer the following:

    a. Date of organization:

    b. Type of partnership:

    c. Name(s) of general partner(s):

6. If your organization is a joint venture, answer the following:

    a. Date of organization:

    b. Name of joint venture:

    b. Names of members to joint venture:

7. If your organization is individually owned, answer the following:

    a. Date of organization:

    b. Name of owner:

8. If the form of your organization is other than those listed above, describe it and name the principals:

II. LICENSING

1. Listed jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

2. List jurisdictions in which your organization's partnership or trade name is filed.

III. EXPERIENCE/RESPONSIBILITY QUALIFICATIONS

1. List the categories of work that your organization normally performs with its own forces.

1. Legal Issues. **(If the answer to any of the questions below is "YES," please explain in the space provided or attach additional pages as needed).**

   To the best of your knowledge after diligent inquiry, in connection with the business of Bidder or any other firm which is related to Bidder by any degree of common ownership, control, or otherwise, do any of the following statements apply to: i) Bidder; ii) Bidder's parent; iii) any Bidder subsidiary or affiliate; iv) any joint venture (including its individual members) or any other partnership (including its individual members) which includes Bidder or Bidder's parent, subsidiaries, or affiliates, v) any legal entity, or parent, subsidiary or affiliate of any legal entity, controlled or 10% or more of which is owned, by Bidder, or by any director, officer, principal or managerial employee of Bidder, or by any person or entity with a 10% or more interest in Bidder or vi) any person who is a director, officer, principal, or managerial employee, or person or entity with a 10% or more interest in any of the aforesaid:

   a. Has failed to complete any work awarded to it?

      □ Yes □ No

   b. Has any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

      □ Yes □ No

   c. Has been party to any lawsuits or arbitrations with regard to construction contracts within the last five years?

      □ Yes □ No

   d. Has been found in violation of any laws relating to its business including, but not limited to, anti-trust laws, licensing laws, tax laws, wage or hour laws, environmental laws, or serious or willful safety violations* by a final decision of a court or governmental agency/authority at any time in the past three years?

      □ Yes □ No

      * For purpose of this question, violations of safety laws may be limited to serious or willful safety violations.

   e. Has been the subject of a voluntary or involuntary bankruptcy proceeding at any time in the past three years?

      □ Yes □ No

f. Has been suspended and/or debarred by any federal, state, or local government agency or authority in the past three years?

□ Yes □ No

g. Has any officer, director, owner or managerial employee of your organization been convicted of a felony relating to his or her work in the construction, maintenance, service and/or repair contracting industry?

□ Yes □ No

h. Has your organization defaulted on any project in the past three years?

□ Yes □ No

i. Has been convicted by a plea or verdict of guilty of, or pleaded nolo contendere to, a misdemeanor or felony in any federal, state or local court?

□ Yes □ No

j. Has pending before any state or federal court or grand jury, any criminal matters, indictments, or information for the alleged commission of a crime, in which the Bidder and/or its officers and/or its managers are involved and which have not been favorably terminated?

□ Yes □ No

k. Is the subject of any pending investigation(s) by any commission, committee or other entity or agency or authority of any state or federal government in connection with the alleged commission of a crime relating to your organization's work in the construction, maintenance, service and/or repair contracting industry?

□ Yes □ No

l. Is currently disqualified from selling or submitting bids/proposals to or receiving awards from or entering into any contracts with any federal, state or local governmental entity, any public authority or any public entity?

□ Yes □ No

m. Has within a three year period preceding this Bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (federal, state or local) transaction or contract under a public transaction; violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property?

□ Yes □ No

3. On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

   a. State total value of work in progress and under contract:

4. On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

   a. State average annual amount of construction work performed during the past five years:

5. On a separate sheet, list the construction experience and present commitments of the key individuals of your organization:

6. Does your organization possess all applicable business, contractor and/or trade licenses or other appropriate licenses or certifications required by state or local law to engage in the services it seeks to perform? If not, provide details regarding when licenses will be acquired.

7. Does the firm have all technical qualifications and resources, including equipment, personnel and financial resources, to perform the referenced contract, or will it obtain same through the use of qualified, responsible subcontractors?

8. Does the contactor agree to comply with any and all access control requirements imposed upon the contractor to gain entry upon Authority property to perform the work if they are the successful contractor?

IV. REFERENCES:

1. Trade References:

2. Bank References:

3. Surety:

   a. Name of bonding company:

b. Name, address, and telephone number of agent:

V. FINANCING

1. Financial Statement.

   a. Attach two years of financial statements, preferably audited, including your organization's latest balance sheet and income statement showing:

      i. Current Assets (e.g. cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

      ii. Net Fixed Assets;

      iii. Other Assets;

      iv. Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries, and accrued payroll taxes);

      v. Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares per values, earned surplus and retained earnings).

   b. Name and address of firm preparing attached financial statement, and date thereof:

   c. Is the attached financial statement for the identical organization named on page one?

   d. If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

2. Will the organization whose financial statement is attached act as guarantor of the contract for construction?

VI. CERTIFICATION AS TO ABILITY TO PERFORM THE CONTRACT

The Contractor certifies under oath that it has extensive experience in the business of constructing, building and installing projects, and has the expertise and know-how required for the Work required in this Contract. The Contractor understands that timely completion of the Work is critical to the operations of the Authority and, therefore, the Contractor agrees to dedicate whatever resources that are necessary to complete the Work in a timely and workmanlike manner.

Dated at this _____day of _____

Name of Organization:_____

By:_____

Title:_____

Notary:

_____

SECTION C. AWARD AND EXECUTION OF CONTRACT

C.1. AWARD OF CONTRACT

The Award of the Contract, if it is awarded, will be to the lowest responsible and responsive Bidder whose Proposal complies with the requirements prescribed herein and whose qualifications are satisfactory to the Authority. As provided by the Invitation to Bid, award of the Contract will be made by the Authority or all Bids rejected within one-hundred twenty (120) days after the Bids are opened.

In making its selection, the DRPA is not required to accept the lowest Cost Proposal and may, in its sole discretion, reject Bids which are not responsive to the requirements stated herein, or may elect to waive some or all irregularities in any Bid or Bids. The waiver or non-waiver of any specific irregularity will not imply or compel similar treatment of any other irregularity. In addition, the DRPA may at any time revoke this Invitation to Bid in its sole discretion and without assuming any liability in connection with its issuance and/or revocation.

The DRPA determination shall be final and binding, and shall not be cause for claims by the Consultant or any subcontractor performing work under this Agreement.

C.2. CANCELLATION OF AWARD

The Authority reserves the right to cancel the Award of any Contract before execution of the Contract when the Authority deems such cancellation to be in its best interest. In no event will the Authority or the Engineer have any liability for the cancellation of such award. The Contractor assumes sole risk and responsibility for expenses prior to execution of the Contract, and shall not commence Work until receipt of the Notice to Proceed, except as to tasks required by the Contract to be performed immediately upon the contract award.

C.3. CONTRACT BONDS

Upon award of the Contract, and at the time of its execution, the Contractor shall submit, via SAP Ariba, to the Authority the following Contract Bonds:

C.3.1. PERFORMANCE BOND - in an amount not less than 100% of the Contract Sum.

C.3.2. LABOR AND MATERIAL PAYMENT BOND - in an amount not less than 100% of the Contract Sum.

C.3.3. Contract Bonds shall be on forms provided in the Contract Documents in Section D and shall be executed by the Contractor, and shall be executed by surety companies authorized to do business in the State of New Jersey and/or Commonwealth of Pennsylvania, or both, depending on the location of the Work and acceptable to the Authority and rated B+ or better by A.M. Best as published in Best's Key Rating Guide.

C.3.4. In the event any of the sureties upon the Bond shall become insolvent or unable, in the opinion of the Authority, to pay promptly the amount of such Bond to the extent which the surety might be liable, then the Contractor, within five (5) days after notice by the Authority to the Contractor, shall, by supplemental Bond or otherwise, substitute another and sufficient surety approved by the Authority in place of sureties so insolvent

or unable. If the Contractor shall fail, within five (5) days or such further time, if any, as the Authority may grant, to substitute another and sufficient surety then the Contractor shall, if the Authority so elects, be deemed to be in default in the performance of its obligations hereunder and upon the said Bond. If such default occurs under this Section C.3.4., then the Authority, in addition to any and all other remedies, may terminate this Contract or may bring any proper suit or proceedings against the Contractor and the sureties, or either of them, or may deduct from any monies then due or which thereafter may become due to the Contractor under the Contract the amount for which the surety that is insolvent or unable as aforesaid shall have justified under bond, and the money so deducted shall be held by the Authority as collateral security for the performance of the condition of the Bond.

C.3.5. In case the surety named in the Proposal is not approved by the Authority, the Bidder naming such surety will be required, within five (5) business days or such further period as may be prescribed by the Authority after notice of such disapproval, to substitute the name of another surety satisfactory to the Authority.

C.3.6. Provisions of the foregoing Contract Bonds shall not limit any liability of the Contractor to the Authority.

C.3.7. All alterations, extensions of time, extra and additional Work, and other changes authorized by the Contract Documents may be made without securing the consent of the Surety or Sureties on the Contract Bonds.

C.4. APPROVALS

Immediately after award of the Contract, but in no event later than fourteen (14) days after receiving Notice of Intent to Award the Contract, the Contractor shall submit, via SAP Ariba, a listing and formal request for approval of all Subcontractors and material suppliers, and the materials they propose to use in compliance with the Technical Specifications. The Contractor shall be responsible to obtain and provide to the Authority completed DRPA Affidavits and Certificates, as required by Section B.5 (or B.6 for FTA projects), in proper form, for each and every Subcontractor whose name is submitted for approval. The information so provided will be utilized in evaluating the Subcontractor's ability and qualification to perform. Approval requests shall indicate the trade section involved and shall include necessary information required for this approval such as brochures, technical data, etc. No materials shall be ordered, fabricated, delivered to the site, or incorporated in the Work until written approval is received from the Engineer.

C.5. INSURANCE

Prior to or at the time of execution and delivery of the Contract, the Bidder to whom the Contract is awarded shall furnish to the Authority an insurance certificate evidencing that he has provided the required coverages specified by this Section. The Contractor may be required, at a later date and upon specific request by the Authority, to furnish certified copies of any or all insurance policies related to protection for the Work under the Contract. All such certificates and certified copies of the policies shall be in a form satisfactory to the Authority and shall list the various coverages and limits.

C.5.1. The Authority shall not be liable for payment of any premiums under the foregoing required insurance policies.

C.5.2. All insurance must be procured from insurance or indemnity companies acceptable to the Authority and authorized to do business in the Commonwealth of Pennsylvania and/or State of New Jersey, or both, depending on the location of the Work.

C.5.3. Neither approval by the Authority nor failure to disapprove insurance certificates furnished by the Contractor shall release the Contractor of full responsibility for all liability as set forth in the indemnification clauses stated in Sections E.39., or as otherwise provided by these Contract Documents.

C.5.4. It shall be the responsibility of the Contractor to ensure that all insurance policies required hereunder shall be automatically renewed upon expiration and continued in full force and effect until final acceptance in writing by the Authority of all the Work covered by the Contract. Each policy shall contain the provision that there will be thirty (30) calendar days prior written notice given to the Authority in the event of cancellation of or any change in the policy.

C.5.5. The minimum requirements of insurance to be carried by the Contractor shall be as specified in Section I.

C.6. EXECUTION OF CONTRACT

C.6.1. Within ten (10) days after notification of award of this Contract, in SAP Ariba, the winning Bidder will be required to submit, via SAP, an executed copy of the Contract, a Labor Bond, a Material Payment Bond, and a Performance Bond. The Authority will execute all copies of these documents and will upload into SAP Ariba for the Contractor.

C.6.2. At the time of execution of the Contract, the Contractor shall submit, via SAP Ariba, the following documents to the Authority:

a. Proof, satisfactory to the Authority, of the authority of the person or persons executing the Contract and Contract Bond on behalf of the Contractor.

b. Satisfactory evidence of all insurance coverage prescribed by the Contract Documents.

c. Proof of current corporate status and certificate of authority to transact business in the state(s) where the Work is to be performed and/or designation of a proper agent(s) in the state(s) where the Work is to be done, upon whom service may be made in the event of litigation, if the Contractor is a non-resident thereof.

d. A certified copy of corporate resolutions or statements signed by all partners, members or the sole proprietor, setting forth the name(s) and position(s) of the person or persons authorized to execute Contract Modifications, Change Orders and/or Monthly Estimates on behalf of the Contractor.

e. All certified copies of contract documents, stamped and signed, must be submitted in hard copy format to the Contracting Officer for this Contract. Contractor can mail these documents to:

Delaware River Port Authority
Contracts Department
One Port Center
2 Riverside Drive
Camden, New Jersey 08103

C.7. FAILURE TO EXECUTE CONTRACT

Failure of a Bidder to whom the Contract is awarded to execute the Contract or to file acceptable bonds or certificates and policies of insurance as provided herein, shall be just cause for the annulment of the award, and the forfeiture of such Bidder's Proposal security.

SECTION D. CONTRACT AGREEMENT

AGREEMENT, made this _____ day of _____, 2019, by and between the Delaware River Port Authority (hereinafter called the "Authority"), and

_____

_____

_____ (hereinafter called the "Contractor").

WHEREAS, the Commonwealth of Pennsylvania and the State of New Jersey have by law created the Delaware River Port Authority, as a body corporate and politic to constitute the public corporate instrumentality of the Commonwealth of Pennsylvania and the State of New Jersey for public purposes;

AND WHEREAS, the Delaware River Port Authority deems it necessary to make this Contract for the Work authorized and directed to be done by said Authority;

NOW, THEREFORE, the parties hereto, each in consideration of the contracts, promises and agreements on the part of the other herein contained, have undertaken, promised and agreed and do hereby undertake, promise and agree, the Authority for itself, its successors and assigns, and the Contractor for itself, its heirs, executors and administrators, successors and assigns, as hereinafter set forth.

ARTICLE I

OUTLINE OF CONTRACT

The Contractor agrees to furnish all necessary plant, labor, and material and to do all Work covered by this Contract in the manner and under the conditions stipulated herein. The Authority agrees to pay the Contractor the sums of money hereinafter mentioned at the time and in the manner and upon the terms and conditions hereinafter set forth in these Contract Documents.

ARTICLE II

TIME OF COMMENCEMENT AND COMPLETION

The Contractor shall commence the Work within ten (10) calendar days of receipt of the Notice to Proceed from the Authority, and shall complete the same within the number of days set forth in the Special Provisions, unless the Contract Time is extended as provided in the Contract Documents. Time is of the essence in this Agreement.

ARTICLE III

CONTRACT SUM

Provided that the Contractor shall strictly and completely perform all of its obligations under the Contract Documents, and subject only to additions and deletions as provided in the General Provisions, the Authority shall pay to the Contractor, in current funds and at the times and in the installments as specified in the General Provisions, a sum determined by the units of Work performed and materials provided according to the Proposal of the Contractor, which sum as proposed shall not exceed _____

_____

Dollars ($) (hereinafter referred to as the "Contract Sum"), and which Contract Sum shall cover the Contractor's profit and general overhead and all costs and expenses of any nature whatsoever (including without limitation, taxes, labor and materials) foreseen or unforeseen, and any increases in said costs and expenses, foreseen or unforeseen, incurred by the Contractor in connection with the performance of the Work, all of which costs and expenses shall be borne solely by the Contractor.

IN WITNESS WHEREOF, this Contract has been executed for the Delaware River Port Authority in and by the authority of a resolution duly adopted by the Authority, and these presents signed and attested by its proper officers, and the Contractor has [hereunto set his hand and seal] [caused its corporate seal to be hereto affixed and these presents to be executed by its President and attested by its Secretary by virtue of a resolution duly adopted by its Board of Directors]* the day and year first above written.

Attest: **DELAWARE RIVER PORT AUTHORITY**

_____ By: _____
Secretary

(SEAL)

_____
Name of Contractor

Attest: _____ By: _____
Secretary President

(SEAL)

_____

*If the Contractor is an individual, a partnership or limited liability company, use the words enclosed in the first bracket; if a corporation, use the words in the second bracket.

ARTICLE IV FORMS

PERFORMANCE BOND

Bond No._____ Bond Amount_____

Contract No._____

1. _____(Contractor/Principal) and _____("Surety"), jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the **Delaware River Port Authority** (hereinafter called the Authority/Obligee) for the performance of the Authority's Contract with the Contractor/Principal, which is incorporated herein by reference.

2. The Surety represents and warrants that it is legally authorized to issue performance bonds and conduct business in the Commonwealth of Pennsylvania and/or the State of New Jersey, as the location of the Work described in the Contract requires.

3. The terms and conditions of this Performance Bond are and shall be that, if Principal shall comply with and shall perform the Contract in accordance with its terms, at the time and in the manner provided in the Contract and if the Principal shall satisfy all claims and demands incurred in or related to the performance of the Contract by the Principal or growing out of the performance of the Contract by the Principal, and if the Principal shall indemnify completely and shall save harmless the Authority and all of its members, directors, officers, employees and agents from any and all costs, expenses and damages, including attorneys' fees, which the Authority or any of its members, directors, officers, employees and agents may sustain or suffer by reason of any such default or failure of the Principal, and if the Principal shall reimburse completely and shall pay to the Authority any and all costs, expenses, and damages, including attorneys' fees, which the Authority or any of its members, directors, officers, employees, and agents may incur by reason of any such default or failure of the Principal, then this Performance Bond shall be void; otherwise, this Performance Bond shall be and shall remain in full force and effect.

4. The Surety's obligation under this Performance Bond shall arise after the Principal has failed to satisfy the terms and conditions set forth in paragraph 3 and/or the terms and conditions of the Contract.

5. The Surety shall complete its investigation and proceed with its obligations under the Performance Bond within twenty (20) days after notice from Authority to the Surety of the Contractor's default, except that Surety shall proceed within twenty-four (24) hours after notice, where notice states that immediate action by the Surety is necessary to safeguard life or property.

6. The Surety's obligations hereunder shall include one or more of the following actions, at Surety's sole cost and expense:

a. Arrange for the Contractor to perform and complete the Contract, provided, however, that the Surety may not proceed with this option, except upon the express written consent of the Authority, which consent may be withheld by the Authority for any reason; or

b. Perform and complete the Contract itself, through qualified contractors who are acceptable to the Authority, through a contract between the Surety and qualified contractors, which performance and completion shall be undertaken in strict accordance with the terms and conditions of the Contract; or

c. Tender payment to the Authority in the amount of all losses incurred by the Authority as a result of the Contractor's default, including all cost of completion of the Contract and all consequential losses, costs, and expenses incurred by the Authority, including, attorneys' fees and expert/consultant fees, provided, however, that the Surety may not proceed with this option, except upon the express written consent of the Authority, which consent may be withheld by the Authority for any reason.

7. This Performance Bond shall be interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania and/or the State of New Jersey, depending on the location of the Work.

8. Any proceeding, suit, or claim, legal or equitable, under this Performance Bond shall be instituted in a court of competent jurisdiction within two (2) years from Final Completion, as defined in the Contract.

9. The Surety hereby waives notice of and consents to (a) all alterations, amendments, or change orders to the Contract and (b) all extensions of time for performance of the Contract and other forbearance; and the Surety agrees that its obligations under this Performance Bond shall not thereby be released or affected in any manner. Any increase in the Contract amount shall automatically result in a corresponding increase in the Performance Bond's penal amount without notice to or consent from Surety, such notice and consent being hereby waived. Decreases in the Contract amount shall not, however, reduce the Performance Bond's penal amount

10. The Surety shall not be liable to the Authority under this Performance Bond in the aggregate in excess of the sum stated above, adjusted by change orders, but never less than the penal sum stated.

11. The Surety shall also be obligated, without duplication, for:

a. The responsibilities of the Contractor for correction of defective or unsuitable work and performance and completion of the Contract;

b. Additional legal, design, and delay costs incurred by the Authority as a result of the Contractor's default, and as a result of the actions or failure of the Surety's obligations under this Performance Bond.

c. Liquidated damages as specified in the Contract, or if no liquidated damages are specified in the Contract, actual damages and consequential damages incurred by the Authority as a result of delayed performance or non-performance by the Contractor and/or Surety; and

d. Payment of all unpaid and owing fees or payments owed to the Authority by the Contractor, pursuant to the Contract at the time of Contractor's default.

SIGNED and SEALED this _____day of _____2019.

_____
(Principal)

ATTEST:_____ BY:_____

_____
Typed Name/Title

_____
(Surety)

BY:_____

_____
Typed Name/Title

SURETY INFORMATION: Failure to complete the following information may result in the rejection of bond.

Point of Contact Information

_____
Contact's Name

_____
Contact's Address County State

_____ _____
Contact's Phone No. Contact's Fax No.

BOND IDENTIFICATION NUMBER:_____

END OF BOND

LABOR AND MATERIAL PAYMENT BOND ("PAYMENT BOND")

Bond No._____ Bond Amount_____

Contract No._____

1. _____(Contractor/Principal) and _____("Surety"), jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the **Delaware River Port Authority** (hereinafter called the Authority/Obligee) to pay for labor, materials, equipment furnished for use in the performance of the Authority's Contract, which is incorporated herein by reference.

2. The Authority requires that the Principal furnish this Payment Bond to the Authority before an award of the Contract shall be made to the Principal by the Authority.

3. The Surety represents and warrants that it is legally authorized to issue labor and material payment bonds and conduct business in the Commonwealth of Pennsylvania and/or the State of New Jersey, as the location of the Work described in the Contract requires.

4. A "Claimant" is defined as one having a direct contract with the Principal or with a subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract.

5. The terms and conditions of this Payment Bond are and shall be that, if Principal shall promptly make payment to all Claimants for all labor and materials used or reasonably required for use in the performance of the Contract and if Principal defends, indemnifies, and holds harmless the Authority from any demands or suits by any person or entity whose claim, demand, or suit is for the payment for labor, materials, or equipment furnished for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

6. To the extent not stated herein, this Payment Bond shall be interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania and/or the State of New Jersey, depending on the location of the Work.

7. Any proceeding, suit, or claim, legal or equitable, under this Payment Bond shall be instituted in a court of competent jurisdiction within two (2) years from Final Completion, as defined in the Contract.

8. The Surety hereby waives notice of and consents to (a) all alterations, amendments, or change orders to the Contract and (b) all extensions of time for performance of the Contract and other forbearance; and the Surety agrees that its obligations under this Payment Bond shall not thereby be released or affected in any manner. Any increase in the Contract amount shall automatically result in a corresponding increase in the Payment Bond's penal amount without notice to or consent from Surety, such notice and consent being hereby waived. Decreases in the Contract amount shall not, however, reduce the Payment Bond's penal amount.

9. The Surety shall not be liable to the Authority under this Payment Bond in the aggregate in excess of the sum stated above, adjusted by change orders, but never less than the penal sum stated.

SIGNED and SEALED this _____day of _____2019.

_____
(Principal)

ATTEST:_____ BY:_____

_____
Typed Name/Title

_____
(Surety)

BY:_____

_____
Typed Name/Title

SURETY INFORMATION: Failure to complete the following information may result in the rejection of bond.

Point of Contact Information

_____
Contact's Name

_____
Contact's Address County State

_____ _____
Contact's Phone No. Contact's Fax No.

BOND IDENTIFICATION NUMBER:_____

END OF SECTION

CONTRACTOR'S PARTIAL RELEASE OF CLAIMS

FROM: _____ **(CONTRACTOR)**
TO: **DELAWARE RIVER PORT AUTHORITY** **(AUTHORITY)**
PROJECT: _____
DATE: _____ **APPLICATION #____**

1. The undersigned does hereby release all claims resulting from labor and/or materials, contract work, equipment or other work, rents, services or supplies heretofore, furnished in, and, for the construction, design, improvement, alteration, additions to or repair of the above described Project.

2. This release is given for and in consideration upon receipt of the payment requested in _____ requisition. (Contractor to insert month, date, year on the line above for current pay period.)

3. It is further warranted and represented that all such claims against the undersigned, or the undersigned's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the Authority have been made for such payments.

4. It is acknowledged that this release is for the benefit of and may be relied upon by the Authority.

5. In addition to the foregoing, this instrument shall constitute a **partial release** of all rights, causes of action, and claims, including, but not limited to, changes in the schedule and work, claims for delay, extended general conditions costs, inefficiency and loss of productivity damages, requests for equitable adjustments, and other types of demands, of the undersigned against the Authority arising out of or pertaining to the above referenced Project, through the date of the current pay period, except the following (none, unless noted)

_____

(attach additional paper if necessary and so note)

6. By executing this Partial Release agreement, the Contractor, and its principal(s), hereby agrees to personally indemnify and hold the Authority harmless should any of the information to which the Contractor has sworn in the proceeding paragraphs be false, including but not limited to the representation that the undersigned's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the Authority have been made for such payment.

FIRM:_____
BY:_____
TITLE:_____

State of:
County of:
The foregoing release was subscribed and sworn to me this ___ day of _____ by _____ (as _____ of _____).

_____
Notary Public
My Commission Expires

SUBCONTRACTOR'S PARTIAL RELEASE OF CLAIMS

FROM: _____ **(SUBCONTRACTOR)**
TO: **DELAWARE RIVER PORT AUTHORITY** **(AUTHORITY)**
_____ **(CONTRACTOR)**
PROJECT: _____
DATE: _____ **APPLICATION #____**

1. The undersigned does hereby release all claims resulting from labor and/or materials, contract work, equipment or other work, rents, services or supplies heretofore, furnished in, and, for the construction, design, improvement, alteration, additions to or repair of the above described Project.

2. This release is given for and in consideration upon receipt of the payment requested in _____ requisition. (Subcontractor to insert month, date, year on the line above for current pay period.)

3. It is further warranted and represented that all such claims against the undersigned, or the undersigned's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the Contractor have been made for such payments.

4. It is acknowledged that this release is for the benefit of and may be relied upon by the Contractor and the Authority.

5. In addition to the foregoing, this instrument shall constitute a **partial release** of all rights, causes of action, and claims, including, but not limited to, changes in the schedule and work, claims for delay, extended general conditions costs, inefficiency and loss of productivity damages, requests for equitable adjustments, and other types of demands, of the undersigned against the Contractor and the Authority arising out of or pertaining to the above referenced Project, through the date of the current pay period, except the following (none, unless noted)

_____

(attach additional paper if necessary and so note)

6. By executing this Partial Release agreement, the Subcontractor, and its principal(s), hereby agrees to personally indemnify and hold the Contractor and the Authority harmless should any of the information to which the Subcontractor has sworn in the proceeding paragraphs be false, including but not limited to the representation that the undersigned's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the Contractor have been made for such payment.

FIRM:_____
BY:_____
TITLE:_____

State of:
County of:
The foregoing release was subscribed and sworn to me this ___ day of _____ by _____ (as _____ of _____).

_____
Notary Public
My Commission Expires

CONTRACTOR'S FINAL RELEASE OF CLAIMS

TO: DELAWARE RIVER PORT AUTHORITY (Authority)
FROM: _____ (Contractor)
CONTRACT # _____
PROJECT: _____

ARCHITECT: _____

1) In consideration of the sum of $_____ and other good and valuable consideration described herein, the undersigned does hereby fully and finally release any and all rights, causes of action, and claims resulting or arising from labor, material, subcontract work, equipment, or other work, rentals, services, or supplies heretofore, furnished by the undersigned, including, but not limited to, changes in the schedule and work, claims for delay, extended general conditions costs, inefficiency and loss of productivity damages, requests for equitable adjustments, and other types of demands, of the undersigned against the Authority arising out of or pertaining to the above referenced Project.

2) In further consideration of the payment made or to be made as above set forth, and to induce Authority to make said payment, the undersigned agrees to defend and hold harmless the Authority from any claim or claims hereinafter made by Contractor and/or its materials suppliers, subcontractors or employees, servants, agents or assigns of such persons against the Authority. The undersigned agrees to indemnify or reimburse all persons so relying upon this release for any and all sums, including attorney's fees, expert fees, and costs, which may be incurred as the result of any such claims.

3) It is further warranted and represented that all such claims described in paragraph 1 above as may be asserted against the undersigned or the undersigned's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the Authority have been made for such payments.

4) It is acknowledged that this release is for the benefit of and may be relied upon by the Authority.

5) In addition to the foregoing, this instrument shall constitute a final release of all debts, rights, claims, damages and demands of the undersigned against Authority, in law or in equity arising out of or pertaining to the above referenced Project to the extent described in paragraph 1 above.

Dated this _____ day of _____, 2019.

FIRM:_____
BY:_____
TITLE:_____

State of:
County of:
The foregoing release was subscribed and sworn to me this ___ day of _____ by _____ (as _____ of _____).

_____
Notary Public
My Commission Expires

SUBCONTRACTOR'S FINAL RELEASE OF CLAIMS

TO: DELAWARE RIVER PORT AUTHORITY (Authority)
_____ (Contractor)
FROM: _____ (Subcontractor)
CONTRACT # _____
PROJECT: _____

ARCHITECT: _____

1) In consideration of the sum of $_____ and other good and valuable consideration described herein, the undersigned does hereby fully and finally release any and all rights, causes of action, and claims resulting or arising from labor, material, subcontract work, equipment, or other work, rentals, services, or supplies heretofore, furnished by the undersigned, including, but not limited to, changes in the schedule and work, claims for delay, extended general conditions costs, inefficiency and loss of productivity damages, requests for equitable adjustments, and other types of demands, of the undersigned against the Contractor and/or Authority arising out of or pertaining to the above referenced Project.

2) In further consideration of the payment made or to be made as above set forth, and to induce Contractor to make said payment, the undersigned agrees to defend and hold harmless the Contractor and Authority from any claim or claims hereinafter made by Subcontractor and/or its materials suppliers, subcontractors or employees, servants, agents or assigns of such persons against the Contractor and/or Authority. The undersigned agrees to indemnify or reimburse all persons so relying upon this release, including the Authority, for any and all sums, including attorney's fees, expert fees, and costs, which may be incurred as the result of any such claims.

3) It is further warranted and represented that all such claims described in paragraph 1 above as may be asserted against the undersigned or the undersigned's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the Contractor have been made for such payments.

4) It is acknowledged that this release is for the benefit of and may be relied upon by the Contractor and Authority.

5) In addition to the foregoing, this instrument shall constitute a final release of all debts, rights, claims, damages and demands of the undersigned against Contractor and Authority, in law or in equity arising out of or pertaining to the above referenced Project to the extent described in paragraph 1 above.

Dated this _____ day of _____, 2019.

FIRM:_____
BY:_____
TITLE:_____

State of:
County of:
The foregoing release was subscribed and sworn to me this ___ day of _____ by _____ (as _____ of _____).

_____
Notary Public
My Commission Expires

SECTION E. GENERAL PROVISIONS

E.1 OUTLINE OF CONTRACT

E.1.1. Subject to the Authority's right to rely upon substantial representations made by the Contractor in making the decision to award the Contract to Contractor, the Contract Documents represent the entire and integrated agreement between the Authority and Contractor and supersedes all prior or contemporaneous negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Change Order or by a Contract Modification.

E.1.2. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Engineer or the Engineer's consultants, (2) between the Authority and a subcontractor or a sub-subcontractor, or (3) between any persons or entities other than the Authority and the Contractor.

E.1.3. In case of conflict between these General Provisions and the Specifications, the latter shall take precedence; but no General Provisions clause referring to the Work of the Contractor shall be considered as waived or modified unless so stated in the Specifications.

E.1.4. Terms capitalized in the Contract Documents include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents.

E.1.5. In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

E.1.6. Words and phrases used in the singular shall be deemed to include the plural and vice versa. Nouns and pronouns used in any particular gender shall be deemed to include any other gender.

E.1.7. Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

E.2 DEFINITIONS

As used herein within any Contract Documents:

E.2.1. AS-BUILT DRAWINGS shall mean the final set of Contract Drawings issued by the Engineer of Record as an accurate reflection of the completed and accepted Work.

E.2.2. AUTHORITY shall mean the Delaware River Port Authority, which includes PATCO, the Port Authority Transit Corporation, a wholly owned subsidiary of the Delaware River Port Authority.

E.2.3. AWARD OF CONTRACT shall mean the lowest responsible and responsive Bidder whose Proposal complies with the requirements prescribed herein and whose qualifications are satisfactory to the Authority.

E.2.4. BULLETIN shall mean a written interpretation, clarification, or revision of any of the Contract Documents transmitted to Bidders in advance of the opening of Proposals.

E.2.5. CHANGE ORDER shall mean a written instrument prepared by the Contracting Officer and signed by the Authority, Engineer, and the Contractor stating their agreement upon all of the following:

E.2.5.1. The change in the Work

E.2.5.2. The amount of the adjustment, if any, in the Contract Sum

E.2.5.3. The extent of the adjustment, if any, in the Contract Time

E.2.6. CHIEF ENGINEER shall mean the duly appointed Chief Engineer of the Authority, or that duly authorized person acting in such capacity.

E.2.7. CHIEF EXECUTIVE OFFICER shall mean the duly appointed Chief Executive Officer of the Authority, or such person acting in such capacity.

E.2.8. CONTRACT shall mean the sum of all Contract Documents. It represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Construction Change Directive, Change Order or Contract Modification.

E.2.9. CONTRACT DOCUMENTS are defined as and shall consist of the executed (1) Contract Agreement, (2) Bidding Information and Proposal Requirements, Proposal, (3) Bid Bond, (4) Performance and Labor and Material Payment Bonds, (5) General Provisions, (6) Special Provisions, (7) Technical Provisions, Quantity

and Payment Provisions, (8) Safety Administrative Manual, (9) Handbook for Protecting Security Information (for projects governed by SP.29.), (10) Non-Disclosure and Confidentiality Agreement (for projects governed by SP.29.) and (11) Contract Drawings, Specifications and any Contract Modifications, Bulletins, Construction Change Directives and Change Orders, and (12) Baseline Schedule and Schedule Updates.

E.2.10. CONTRACT DRAWINGS shall mean the drawings, designs, plans, and graphic and pictorial portions of the Work as developed, supplemented and modified, or to be developed, supplemented and modified by the Engineer, the Authority, or the Authority's designers. The Contract Drawings are further enumerated and described in the Special Provisions.

E.2.11. CONTRACT MODIFICATION or MODIFICATION shall mean a (1) a written amendment or supplement to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Authority.

E.2.12. CONTRACTOR shall mean the person or organization identified as such in the Contract Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" includes the Contractor and such other person or persons acting as agents or employees of the Contractor. The Contractor is responsible for the acceptable performance of the Work and for the payment of all debts pertaining to the Work.

E.2.13. CONTRACT TIME shall mean the period of time allowed in the Contract Documents for completion of the Work.

E.2.14. USDOT shall mean the United States Department of Transportation.

E.2.15. DRPA shall mean the Delaware River Port Authority, which includes PATCO, the Port Authority Transit Corporation, a wholly owned subsidiary of the Delaware River Port Authority.

E.2.16. DULY AUTHORIZED REPRESENTATIVE of the Chief Executive Officer shall mean that member of the Authority's staff designated by the Chief Executive Officer in writing to act as his duly authorized agent to perform the duties and obligations of the Chief Executive Officer.

E.2.16.1 Only such Duly Authorized Representative of the Authority is authorized to grant on behalf of the Authority, any approval, consent or waiver with respect to the Contract Documents or the Work, or to otherwise act for the Authority in any capacity whatsoever, except as otherwise provided by the Contract Documents.

E.2.16.2 The Authority (and not the Chief Executive Officer or Duly Authorized Representative) shall be solely obligated to the Contractor for all sums required to be paid by the Authority to the Contractor hereunder.

E.2.17. ENGINEER shall mean that person or organization designated as such by the Authority to lead the construction monitoring efforts to serve and protect the interests of the Authority, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Engineer" means the Engineer or his authorized representative.

E.2.18. ENGINEER OF RECORD shall mean the Professional Engineer registered in the Commonwealth of Pennsylvania and/or the State of New Jersey who has prepared the Contract Drawings and Specifications and upon which his seal has been placed.

E.2.19. MAJOR ITEM shall mean any scheduled item of the Proposal which amounts to more than 15% of the Total Price Bid for the Contract, based on the original quantity of that item multiplied by the unit price bid.

E.2.20. NJDEP shall mean the New Jersey Department of Environmental Protection.

E.2.21. NJDOT shall mean the New Jersey Department of Transportation.

E.2.22. NJDOT STANDARD SPECIFICATIONS shall mean the New Jersey Department of Transportation's Standard Specifications for Road and Bridge Construction and the Supplemental Specifications (as revised to date of bid opening).

E.2.23. NOTICE shall mean a written notice.

E.2.24. PADEP shall mean the Pennsylvania Department of Environmental Protection.

E.2.25. PATCO shall mean the Port Authority Transit Corporation, a wholly owned subsidiary of the Delaware River Port Authority.

E.2.26. PENNDOT or PADOT shall mean the Pennsylvania Department of Transportation.

E.2.27. PENNDOT or PADOT STANDARD SPECIFICATIONS shall mean the Pennsylvania Department of Transportation's Specifications Publication 408 (as revised to date of bid opening).

E.2.28. PRESIDENT shall mean the dully appointed President of PATCO, or such person acting in such capacity.

E.2.29. PROJECT means the total construction of the Work performed under the Contract Documents which may be the whole or a part and which may include construction by the Authority and by separate contractors.

E.2.30. PROVIDE shall mean furnish, completely install and, when appropriate, test to demonstrate satisfactory performance or operation.

E.2.31. RECORD DRAWINGS shall mean a red-lined set of Contract Drawings maintained and updated weekly by the Contractor at the Project site to depict the current progress of the Work and any changes or additions thereto. The Record Drawings shall be furnished to the Engineer of Record, or as designated by the Authority, for preparation of the As-Built Drawings.

E.2.32. SEPTA shall mean the Southeastern Pennsylvania Transportation Authority.

E.2.33. SHOP DRAWINGS, also referred to as Detail Drawings, shall mean those drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a subcontractor, subcontractor, manufacturer, supplier or distributor to illustrate specific details, physical dimensions, material properties and other pertinent attributes of some portion of the Work.

E.2.34. SPECIFICATIONS shall mean that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

E.2.35. SUBCONTRACTOR shall mean any person or organization having a direct contract with the Contractor to perform any portion of the Work at or about the construction site or to supply any labor, materials or equipment to be incorporated in, or utilized in connection with, the Work. The term "subcontractor" means a subcontractor or an authorized representative thereof.

E.2.35.1 All references to subcontractors in the Contract Documents shall apply equally to lower tier subcontractors who contract with subcontractors contractors of the Contractor also for the performance of Work at the site, or supply of labor, materials or equipment to be incorporated in, or utilized in connection with, the Work. The term "subcontractor" shall apply to all lower tier subcontractors.

E.2.36. WORK means all supervision, monitoring, planning, furnishing, management, oversight, labor support services, materials, appliances, facilities, products, fixtures, tools, trucking, rigging, equipment, supplies and services necessary or appropriate to achieve final completion of the Project, in strict compliance with, and as required by the Contract Documents and the laws in a timely, first class, and professional manner, and as reasonably inferable therefrom by a competent contractor experienced in a project of this size and scope and who is familiar with the conditions in Pennsylvania/New Jersey/Delaware metropolitan area. The Work may constitute the whole or a part of the Project.

E.2.37. WORKING DRAWINGS, also referred to as Erection Drawings, shall mean those drawings prepared by the Contractor which provide specific assembly instructions and show the interrelationship between individual components to be permanently or temporarily incorporated in, or utilized in connection with, the Work.

E.2.38. Wherever in these Contract Documents the words "directed", "required", "permitted", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the direction, requirements, permission, order, designation or prescription of the Engineer is intended, and, similarly, the words "approved", "acceptable", "satisfactory", or words of like import shall mean approved by, or acceptable to, or satisfactory to the Engineer.

E.2.39. Wherever in the Contract Documents the words Total Price, Total Bid, or Total Cost appear, it shall be understood that the Contract Sum as described in Section D and adjusted based on any Construction Change Directive or duly executed Change Order or Contract Modification is intended.

E.3. SCOPE OF WORK

E.3.1 GENERAL

The Contractor shall furnish all materials, tools, equipment, transportation, supervision, and perform all labor and services necessary and incidental to the satisfactory completion of the Work in a proper workmanlike manner within the time stipulated, all as shown on the Contract Drawings and as described in the Specifications.

E.3.2. CORRELATION AND INTENT OF CONTRACT DRAWINGS AND SPECIFICATIONS

E.3.2.1. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by any one shall be as binding as if required by all. Where the Contract Documents describe portions of the Work in general terms, but not in complete detail, and where the Contract Documents do not specifically allow the Contractor a choice of quality or cost of items to be furnished, but could be interpreted to permit such choice, the best general practice shall be followed and only new materials and workmanship of best quality shall be used.

E.3.2.2. The organization of the Specifications into divisions, sections and paragraphs, and the arrangement of the Contract Drawings, are not intended to influence the Contractor's division of the Work among subcontractors or in establishing the extent of the Work to be performed by any trade. The Authority assumes no liability arising

out of jurisdictional issues or claims advanced by trade organizations or other interested parties based on the arrangement or manner of subdivision or content of the Contract Drawings or Specifications or otherwise for assignment by Contractor of the various components of the Work to be performed. Issues or claims referred to herein (including, without limitation, claims based on alleged mistaken assignments by Contractor of any one or more components of the Work) shall not entitle the Contractor to an increase in the Contract Sum or to an extension of the Contract Time. The Contractor shall only employ labor in connection with the Work capable of working harmoniously with all trades, crafts and any other individuals associated with the Project.

E.3.2.3. Where conflict exists within or between parts of the Contract Drawings and Specifications, or between the Contract Drawings and Specifications and applicable standards, codes, ordinances and other legal requirements, the Engineer shall have the right to correct apparent errors or omissions in the Contract Drawings and Specifications, and to make such interpretations as the Engineer may deem necessary for the proper completeness and objective purposes of the Contract Drawings and Specifications. Where conflict exists within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, ordinances and other legal requirements, the more stringent requirement shall apply.

E.3.2.4. Any conflicts or discrepancies among the Contract Documents shall be brought to the attention of the Engineer before proceeding with the Work affected thereby. Where the Work is shown in detail on only part of a Contract Drawing, this Work shall apply to other similar portions of the Project. Work on the Contract Drawings not mentioned in the Specifications, or vice versa, must be executed as if shown and mentioned on or in both. In case of conflicts between the Contract Drawings and the Specifications, or within either the Contract Drawings or the Specifications, the better quality or greater quantity shall be provided. Wherever singular number and/or words are used in the Specifications and the Work requires more than one of the items described, the plural and/or the word “each” shall be understood and inferred and as many units as are necessary for a complete installation shall be provided.

E.3.2.5. If, in the performance of the Work, the Contractor discovers any errors or omissions in the Contract Documents, or in the Work, the Contractor shall immediately notify the Engineer and the Engineer shall promptly verify the same. If the Contractor proceeds with Work affected by such errors, inconsistencies or omissions without

receiving interpretation or clarification from the Engineer, the Contractor does so at its own risk, and all costs, expenses and/or damages arising therefrom shall be at the Contractor's sole expense.

E.3.2.6. Figures marked on the Contract Drawings shall be used in reading dimensions and no scale dimensions shall be used. Contract Drawings showing greater detail shall, in general, govern. The Contractor shall compare Contract Drawings, verify the figures, obtain true and actual field measurements, and prepare its own Working Drawings and Shop Drawings before layout of the Work and shall be responsible for errors which might have been avoided by doing so.

E.3.2.7. The Contract Drawings show conditions as they are believed to exist, but it is not intended or to be inferred that the conditions as shown thereon constitute a representation by or on behalf of the Authority that such conditions actually exist. The Contractor shall inspect the job site and perform all reasonable additional due diligence, prior to the commencement of the Work and shall accept full responsibility for any loss sustained by the Contractor as a result of any variances between the conditions as shown on the Contract Drawings and the actual conditions revealed during the progress of the Work or otherwise. The Contract Sum shall in no event be increased or decreased by reason of any variance, except as specifically provided by Section E.4.15., "Differing Site Conditions."

E.3.2..8 In all paragraphs that describe or summarize the Work throughout the Contract Documents, the Work described includes but is not limited to those items specifically mentioned in the list but rather all labor, materials and equipment necessary to complete the Work to the highest-quality standard with the full intent and meaning of the Contract Documents.

E.3.2..9. The Contractor shall be aware of the site limits and boundaries for the Project. Under no circumstances should physical construction extend beyond these site limits and boundaries or equipment and material moved outside these site limits and boundaries without written authorization from the Engineer.

E.3.2..10. Where a choice of color, pattern, or texture is available for a specified product or item or equipment, the Engineer will make a selection from the manufacturer's highest or best standards.

E.3.2.11. With the exception of those materials specifically noted in the Contract Drawings and Specifications to be salvaged, all

demolished materials, surplus materials and excess excavation resulting from the Work shall become the property of the Contractor. At the Contractor's expense, all such materials shall be promptly removed from the site and disposed of in a proper and legal manner.

E.3.2.12. If a specified item is shown or indicated as the responsibility of more than one prime contractor, the bidders for those prime contractors shall submit questions for clarification. If no questions are submitted and/or no clarification is issued prior to bidding, after Contracts are awarded the Engineer will issue a clarification as to which Contractor shall provide the item. The Contractor not supplying the Work in question will be issued a deduct change order for the Work in question.

E.4. CHANGES IN THE WORK

E.4.1. The Authority (by its Chief Executive Officer or Board of Commissioners as provided by DRPA governing documents) may at any time, by written Change Order or Construction Change Directive, without invalidating the Contract and without notice to the Sureties, make changes in the Work, the Contract Drawings and/or Specifications, and other changes within the general scope of the Contract Documents consisting of additions, deletions, or other modifications in the method or manner of its performance. The Contract Sum and Contract Time shall, where applicable, be increased or decreased in the manner hereinafter set forth; provided, however, that if the Contractor shall proceed with a Change in the Work upon an oral order, by whomsoever given, it shall constitute a waiver by the Contractor of any claim for an increase in the Contract Sum or Contract Time on account thereof. Upon receipt of a Change Order or Construction Change Directive, the Contractor shall promptly proceed with the Change in the Work, even though the amount of any resultant increase or decrease in the Contract Sum has not yet been determined.

E.4.2. A change in the Contract Sum or Contract Time shall be accomplished only by Change Order or Construction Change Directive. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Authority has been unjustly enriched by the Contractor's performance of its Work, shall be the basis of any claim for an increase in the Contract Sum or Contract Time.

E.4.3. Contractor shall have no more than seven (7) business days to provide pricing on the Authority's requested changes from date of receipt of request from the Authority or Engineer.

E.4.4. When submitting its change proposal, the Contractor shall include and set forth in clear and precise detail the breakdowns of labor and materials for all trades involved and the estimated impact on the construction schedule. The Contractor shall furnish

adequate supporting documentation from which the breakdowns were prepared, together with supporting documentation, if requested, of any subcontractor.

E.4.5. A Change Order shall be based upon agreement among the Authority and Contractor and a Construction Change Directive requires agreement by the Authority and Engineer and may or may not be agreed to by the Contractor.

E.4.6. Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order or Construction Change Directive.

E.4.7. The Contractor's agreement to any Change Order shall constitute a final settlement of all matters relating to the Change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such Change in the Work and any and all adjustments to the Contract Sum, as well as any and all claims for an increase in the Contract Time and/or compensation therefore. Consistent with this Agreement, all Change Orders will include the following language "Through acceptance of this Change Order, this Contractor acknowledges that it has reviewed the progress of the Work related to this Project and the potential impact of the additional Work on the progress of the Project in the future. As a result, this Change Order includes compensation to the Contractor for any and all effects, delays, and inefficiencies or similar demands associated with the Project and the Contractor recognizes and understands that there is no basis for any such claim in the future."

E.4.8. Notwithstanding anything to the contrary in the Contract Documents, the Contractor shall not be entitled to receive any mark-up for general conditions or overhead in a Change Order if the change does not increase the actual general conditions or overhead costs of the Contractor.

E.4.9. If a Change Order provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

E.4.9.1. mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation

E.4.9.2. unit prices stated in the Contract Documents or subsequently agreed upon

E.4.9.3. cost to be determined in a manner agreed upon by the parties

E.4.10. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Authority, the applicable unit prices shall be equitably adjusted.

E.4.11. Elimination or reduction in quantity by the Authority of any item of Work will not be considered as a basis for a claim for additional payment for loss of anticipated profits.

E.4.12. Work shall not proceed on any portion of the Work, affected by a proposed change by the Authority, until a Change Order, Construction Change Directive, or Modification is issued and the Contractor is directed, in writing, by the Authority to commence Work thereon. If, in the opinion of the Chief Executive Officer, the circumstances are of such emergency or other critical nature that it would be impractical or more expensive to delay action until formal approval by the Authority, the requirements of this Section may be waived, and the Contractor directed to proceed. In such event, the Chief Executive Officer shall authorize the change in writing, subject to subsequent execution of a Change Order, Construction Change Directive, or Modification, as needed.

E.4.13. **CONSTRUCTION CHANGE DIRECTIVES**

E.4.13.1. A Construction Change Directive is a written order prepared by the Engineer and signed by the Authority and Engineer, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Authority may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

E.4.13.2. A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

E.4.13.3. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Engineer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

E.4.13.4. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

E.4.13.5. Force Account Basis. If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Authority on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case

of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, the Contractor shall keep and present, in such form as the Authority and the Engineer may require, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph E 4.13.5 shall be limited to the following:

E.4.13.5.1. Labor. For all foremen, equipment operators, skilled, semi-skilled and common labor directly assigned to the Work required by the Construction Change Directive, the Contractor will receive the actual payroll rate of wage per hour and fringe benefits paid for each and every hour that such employees are actually engaged in the performance of the Work required by the Construction Change Directive, plus twenty percent (20%) in addition thereto.

E.4.13.5.2. Contractor may also charge, without any markup, the following percentages paid as a result of performing the additional Work authorized by the Construction Change Directive:

(a) Social Security Tax at the percentage legally required.

(b) Unemployment Tax at the percentage legally required.

(c) Workmen's Compensation Insurance at the policy percentage rate.

(d) Contractor's Public Liability Insurance at the policy percentage rate.

(e) Contractor's Property Damage Liability Insurance at the policy percentage rate, including coverage for damage due to blasting and explosions when such additional coverage is secured on projects when blasting is required.

E.4.13.5.3. Materials. For all materials used, the Contractor may charge the actual cost of the materials, including applicable taxes and transportation charges, as shown by original receipted bills, plus fifteen percent (15%) for overhead and profit.

E.4.13.5.4. Equipment. For any equipment, including machinery and trucks, deemed necessary by the Authority, the Contractor will be allowed rental rates, which shall include fuel, lubricants, power, parts, and maintenance, determined by a rental rate computed as follows:

(a) For all necessary equipment, except pumps and compressors, an hourly rental rate will be determined by using the monthly rental rates taken from the current edition of "Compilation of Nationally Averaged Rental Rates for Construction Equipment" of the Associated Equipment Distributors and dividing it by 160; for pumps and compressors, the divisor shall be 120. In the case of any necessary machinery or equipment not referred to in the Associated Equipment Distributors book, a monthly rental rate shall be computed on the basis of an amount that is the equivalent of five percent (5%) of the manufacturer's list price for the sale (new) of such equipment; the hourly rate in such cases shall be ascertained as aforesaid depending on the category of such equipment.

(b) The Contractor will be compensated for each and every hour that such necessary machinery, trucks and equipment are in actual operation on the Work required by the Construction Change Directive, at the rates agreed upon, to which no percentage for overhead and profit shall be added. Operators' wages shall be included in the cost of labor described above. Actual, reasonable, and documented costs for transportation of the equipment to and from the site of the Work will be allowed.

E.4.13.5.5. Insurance. To the extent the Contractor is required to carry such insurance by Section I of the Contract Documents, the Contractor may also charge the following percentage of insurance rates, if any, paid as a result of performing the additional Work authorized by the Construction Change Directive, provided, however, that such costs are without

duplication or overlapping of other charges allowed herein:

(a) Railroads' Protective Public Liability Insurance at the policy percentage rate.

(b) Railroads' Protective Property Damage Liability Insurance at the policy percentage rate.

(c) Any "special" insurance applicable to railroads, not covered by the Contractors' Protective Public Liability and Property Damage Liability Insurance will be so indicated in the Special Provisions.

(d) No allowance will be made for Contractors' Protective Public Liability and Property Liability Insurance.

No overhead or profits will be added to these insurance items.

E.4.13.5.6. Miscellaneous. No additional compensation will be made for general superintendence, administration and related services and facilities for the Work, whether at or away from the site, including but not limited to payroll, purchasing, accounting, engineering, supervision, clerical and janitorial services, for offices and other facilities, and for expenses of bonding, use of small tools and all other costs for which no specific allowance is herein provided.

E.4.13.5.7. Subcontract. For any Work authorized in writing by the Authority to be performed by a subcontractor, the Contractor will be paid the actual and reasonable cost of such subcontracted Work, computed with the approval of the Chief Executive Officer or his Duly Authorized Representative on the basis as provided for in this Section E.4.13.5. Additionally, two percent (2%) of the total Force-Account cost will be paid to cover administration, general superintendence, other overhead, bonds, insurance, anticipated profit, and use of small tools and equipment for which no rental is allowed.

E.4.13.6. The Contractor's representative and the Engineer shall compare records of extra Work done on a Force-Account basis at the end of each day. All claims for extra Work done on a Force-Account basis shall be submitted to the Authority by the Contractor, upon certified triplicate itemized statements, and shall specify the following:

E.4.13.6.1. Labor. Name, classification, date, daily hours, total hours, and rate, for each foreman, equipment operator, skilled, semi-skilled and common laborer. (Added to this invoice or payroll transcript shall be the percentage rates paid for the appropriate tax and insurance items. The Contractor shall also calculate twenty percent (20%) for overhead and profit on the Contractor's actual labor costs, as specified in Section E.4.13.5.1.).

E.4.13.6.2. Material. Quantities of materials by name, and price (including applicable tax and transportation charges). (The Contractor shall also calculate fifteen percent (15%) for overhead and profit on the material as specified Section E.4.13.5.3.).

E.4.13.6.3. Equipment. Designation, date, daily hours, total hours, and rental rate for each item of equipment, including machinery and trucks.

E.4.13.6.4. Summary. Summarize the labor, material and equipment costs, and insurance costs.

E.4.13.7. Statements shall be accompanied and supported by receipts and invoices for all materials used, taxes, and transportation charges. However, if materials used on the Force-Account Work are not specifically purchased for such Work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit, certifying that such materials were taken from its stock, that the quantity claimed was actually used, and that the price and taxes claimed represent the actual cost to the Contractor.

The required statements shall be filed during the month following that in which the Work was actually performed.

E.4.13.8. Should the Contractor refuse to prosecute the Work as directed, or to submit its costs as required, the Authority may proceed to take any or all of the actions stipulated in the Termination for Default provisions in Section E.16.

E.4.13.9. Pending final determination of the total cost of a Construction Change Directive to the Authority, amounts not in dispute for such changes in the

Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Engineer will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Section E.10.

E.4.14. **CONTRACT MODIFICATION**

E.4.14.1. The Engineer will have authority to order, in writing, minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents provided, however, that the Engineer, if feasible, should give the Authority prior written notice of the minor change, and if giving prior notice is not feasible, the Engineer shall provide the Authority with written notice of the minor change within one (1) business day of making a minor change.

E.4.15. **DIFFERING SITE CONDITIONS**

E.4.15.1. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the Engineer and Authority promptly before the conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Engineer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Engineer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Engineer shall so notify the Authority and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Engineer has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Authority and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Engineer for determination. No adjustment in the Contract Time

or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project.

E.4.15.2. Whatever subsurface material information is indicated in the bid package information or drawings, based upon soundings, dug test pits, and/or auger or test borings or other information contained in geotechnical reports or similar documents, such information relative to the character of subsurface material is of a preliminary nature and has been obtained for the exclusive use of the Authority to facilitate the design of the Project. Therefore, this information is privileged and not to be considered as a part of the drawings, cross-sections, proposal, or Contract, or as a factor for computation of the prices used for bidding a pricing purposes. If such information is given to the Contractor, it is given for guidance only. There is no express or implied agreement that the depths or the character of material have been correctly indicated at, or that uniformity of material exists between, the explored locations and the Contractor is expressly cautioned not to rely on the privileged information, but to assume the possibility that conditions, affecting the cost and/or quantities of Work to be performed, may differ from those indicated. As such, the Contractor shall rely on its independent investigation in estimating contract costs.

E.4.15.3. The Contractor further covenants and warrants that it had sufficient time to examine the site of the Work, that it has examined the site of the Work; that it has had sufficient time to determine the character of the subsurface material and conditions to be encountered; and that it has based the within contract prices on its own independent examination and investigation of the site, subsurface materials and conditions and has not relied on any subsurface information furnished to it by the Authority.

E.5. PROTECTION OF PERSONS AND PROPERTY

E.5.1. The safety, protection and convenience of the public and that of the owners and users of adjacent sites are of primary importance and shall be provided for by the Contractor in an adequate and satisfactory manner.

E.5.2. The Contractor shall take all measures, precautions, and institute programs, including special precautions due to hazardous or otherwise dangerous parts of the

Work, for the safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

E.5.2.1. employees on the Work and other persons who may be affected thereby

E.5.2.2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's subcontractors or sub-subcontractors

E.5.2.3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and Utilities not designated for removal, relocation or replacement in the course of construction

E.5.3. The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

E.5.4. Machinery, equipment and other hazards of any character shall be operated and maintained in accordance with the safety provisions of the current "Manual of Accident Prevention in Construction," published by the Associated General Contractors of America, to the extent that such provisions are not inconsistent with applicable federal, state and local laws and regulations and the Safety Administrative Manual.

E.5.5. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor at the Contractor's cost and expense.

E.5.6. **UTILITIES**

E.5.6.1. The Contractor shall be responsible for the safety, protection, maintenance and final restoration to a condition at least as useful, safe and durable as it existed prior to construction, of all surface and subsurface utilities (together with all parts and appurtenances thereof), facilities, streets, waterways, structures and other properties at or near the site, unless otherwise specifically provided in writing by the Authority.

E.5.6.2. The term "utilities", as referred to in this Section, shall include water, electricity, gas, garbage and sewage disposal utilities owned by the Authority, as well as public utilities and other privately owned utilities.

E.5.6.3. The Contractor shall not proceed with the Work until the Contractor has made diligent inquiry at the offices of the Chief Engineer, the utility companies, municipal authorities and/or other agencies to determine the exact location of utilities. The Contractor shall also contact the Pennsylvania and/or New Jersey One-Call System (as the location of the Work requires) for mark-out of the utilities prior to beginning the Work. The Contractor shall notify all utility companies and municipalities and/or other agencies involved, in writing, of the nature and scope of the Work and of the Contractor's operations that may affect their facilities or property. Two copies of such notices shall be sent to the Engineer.

E.5.6.4. The Authority will provide, to the best of its ability, the approximate location of all known underground utilities within the Authority's right-of-way. The Contractor, however, shall be responsible for independently confirming these locations with the appropriate utility companies and exercise extreme caution during excavation, demolition and general construction until the extent of existing underground utilities, cable routes and drainage facilities are more fully determined.

E.5.6.5. The Contractor shall exercise every precaution to avoid damage to existing utilities. Should any utilities become damaged or inoperable during construction operations, the Contractor shall immediately stop Work and notify the Authority and the Engineer on the specifics of the damage. The Contractor shall be responsible for all costs related to the repairs deemed necessary by the Authority and the Engineer. If a third-party utility or municipality facility is involved, the Contractor shall be responsible for all costs related to the repairs deemed necessary after consultation with said entity.

E.5.6.6. The Contractor shall carefully locate all subsurface structures before beginning any Work in the vicinity of such structures, and the Contractor shall perform the Work in such a manner as to avoid any damage to said structures.

E.5.6.7. The Contractor shall be responsible for the continuity of service of all overhead, surface and subsurface utilities affected by the Contractor's Work, and shall maintain them in a safe and satisfactory operating condition, unless otherwise noted in the Specifications.

E.5.6.8. The Contractor shall carry out the Work carefully and shall support and secure utility structures in a manner as to avoid damage to them. Flow in drains and sewers shall be satisfactorily maintained. The Contractor shall not move any utility structures without written consent by the Authority and, at the completion of the Work, such structures shall be in a condition as safe and permanent as prior to performance of any Work by the Contractor.

E.5.6.9. The Contractor shall remedy, at its own expense, any direct or indirect damage that may be done in the course of construction to any utility structure or property through or by reason of the prosecution of the Work by the Contractor. The Contractor accepts liability under this covenant as absolute and not dependent upon any determination of negligence by the Contractor or any of its agents, servants, employees, subcontractors or suppliers. The neglect of the Engineer to direct the Contractor to take any particular precaution or to refrain from any particular activity shall not excuse the Contractor from such liability.

E.5.6.10. If any utility structures, facilities or equipment are damaged by the Contractor, the Contractor shall notify the owner of said structures, facilities or equipment immediately of such damage and bear all costs incurred in repairing the damaged structures, facilities or equipment. If the Contractor fails to make payment for such repairs within thirty (30) days of their completion, the Authority may retain an amount sufficient to cover the cost thereof from monies due or that may become due to the Contractor under the Contract.

E.5.6.11. It is understood and agreed that by submitting its bid, the Contractor has fully considered all of the permanent and temporary utility appurtenances in their present or relocated positions, and that no additional compensation will be allowed for delays, inconvenience or damage sustained by the Contractor due to any interference from the said utility appurtenances or the operation of moving them.

E.5.7. PROTECTION OF STRUCTURES

E.5.7.1. The Contractor shall exercise every precaution to ensure that no damage is done to any existing or new structures due to the Contractor's execution of the Work. Should any structure be damaged by or through any of the Contractor's execution of the Work, such injury or damages shall be replaced or repaired immediately, in a manner satisfactory to the owner of such structure, and at the Contractor's expense.

E.5.7.2. The Contractor, at its own expense, shall provide and maintain temporary protection of all structures during the execution of the Work. This protection is subject to acceptance by the Engineer.

E.5.7.3. The Contractor shall not place any loads in excess of either the design loading or the capacity of the structure, as determined according to the appropriate design criteria and based upon the existing condition of the structure at the time the loads are to be applied. For bridge structures, AASHTO Standard Specifications for Bridge Design (Allowable Stress or Load Factor Methods) shall be used unless otherwise directed or approved by the Engineer in writing. For building and facilities, the International Building Code as amended to the latest edition shall be used unless otherwise directed or approved by the Engineer in writing. Any time the construction weakens the structure by the removal of material or for any other reason, the Contractor shall submit design information to satisfy the Engineer that the structure is not over stressed. The effects on the structure of all procedures, construction vehicles, and equipment proposed for use by the Contractor, in combination with all other loads present, shall be calculated, at the Contractor's expense, by and checked by a Professional Engineer registered in the Commonwealth of Pennsylvania and/or the State of New Jersey as the location of the Work requires. These calculations shall indicate that the construction procedures and the type, size, and weight of all equipment and materials placed on the structure, in combination with all other loads present, will not subject the structure to loads in excess of its capacity as determined using the AASHTO Load Factor or Allowable Stress methods. All calculations shall be submitted to the Engineer for approval. No Work requiring load calculations shall commence until the Contractor receives written approval of the calculations from the Engineer.

E.5.7.4. No Work that requires temporary support or shoring shall begin until the structure has been shored to carry the loads imposed on it. The Contractor shall provide, at its own expense, design calculations, prepared by a Professional Engineer registered in the Commonwealth of Pennsylvania and/or the State of New Jersey as the location of the Work requires, for all falsework and temporary pieces which are utilized in connection with the Work. No allowable overstress will be permitted in falsework or temporary pieces. Furthermore, Shop Drawings and Erection Drawings shall be prepared for all temporary shoring, support and/or falsework utilized in connection with the Work. The Contractor shall submit the design calculations, Shop Drawings and Erection Drawings to the Engineer for review and approval prior to the installation of the temporary support measures.

E.5.8. PUBLIC CONVENIENCE AND SAFETY

E.5.8.1. All fire hydrants and standpipes shall, at all times, be left clear of obstructions and readily accessible to fire apparatus, and no materials or other obstructions shall be placed within ten (10) feet of a fire hydrant or standpipe. Fire alarm boxes shall be readily accessible and open to view.

E.5.8.2. The Contractor shall be required to furnish watchmen for each crew of workmen, at its own expense, to protect its men whenever working within or adjacent to streets, roadways or railroad tracks, and the Contractor shall instruct its workmen regarding the hazards involved with working in said areas.

E.5.8.3. If any operation, practice or condition during the course of the Work is unsafe or is deemed by the Engineer to be unsafe, the Contractor shall, at its own expense, immediately take corrective action. Where any operation, practice or condition endangers persons or property, it shall be immediately discontinued by the Contractor and adequate remedial action taken before the affected part of the Work is resumed.

E.5.8.4. Trucks hauling materials shall have tight tailgates and shall be loaded with adequate freeboard of not less than three (3) inches, without precarious cones or piles of materials.

E.5.8.5. The Contractor shall, at its own expense, immediately remove from the worksite all dirt and other materials that were spilled, washed, tracked or otherwise deposited during its hauling and/or other operations whenever the accumulation is sufficient to cause the formation of mud, interfere with drainage, obstruct or clog the drainage systems, damage pavements, or create a traffic or other safety hazard.

E.5.8.6. The Contractor shall take all necessary steps to eliminate dust, smoke, or debris from traveling onto other property and will comply with any applicable regulations, codes or law of any governmental authority with jurisdiction. The materials and methods used for dust control shall be subject to the approval of the Engineer and shall meet any containment requirements, if applicable, set forth in the Technical Provisions.

E.5.8.7. If required by the Authority, the Contractor shall provide the Authority within ten (10) days of said request a letter, signed from an authorized representative of a landfill operation, certifying that it will be receiving the demolition materials and other debris associated with the Work. No separate payment will be made in

connection with this provision, but all costs thereof shall be deemed to be included in the Contract Sum.

E.5.9. **MAINTENANCE AND PROTECTION OF TRAFFIC**

E.5.9.1. Where applicable to the Contract Work, the Contractor shall undertake the following provisions for maintenance and protection of pedestrian and vehicular traffic:

E.5.9.1.1. The Contractor shall plan and conduct the Work in such a manner as to maintain a continuous flow of traffic at all times along all existing roadways within and adjacent to the Project site, with a minimum amount of interruption of or interference with such traffic, except where the Contract Documents specifically permit the closing of a portion or all of an existing roadway normally open to traffic.

E.5.9.1.2. Pedestrian traffic shall be protected at all times. Temporary walkways shall be provided by the Contractor where necessary in order to maintain safe routes of access. The Contractor shall protect all pedestrians from tripping hazards caused by equipment, materials, and construction staging. The Contractor shall provide secure and slip proof temporary fillers, tapered edges, and coverings wherever necessary to prevent tripping hazards.

E.5.9.1.3. Prior to commencing any Work which will impact upon the flow of vehicular and pedestrian traffic, the Contractor shall submit to the Engineer a written plan of the methods, facilities and devices the Contractor proposes to use for the maintenance and protection of such traffic.

E.5.9.1.4. All public traffic shall be permitted to pass through the Work with as little inconvenience and delay as possible. The Contractor shall provide and maintain ingress and egress for all residences and places of business located within the construction limits. Adequate temporary crossings shall be constructed and maintained where access to adjacent property is desired, whether for convenience or fire protection. Where the temporary rerouting or closing to traffic of any public street or highway is necessary, the Contractor shall make all necessary arrangements with the appropriate city, county and/or state agency

having jurisdiction thereof. Additionally, when the Contractor wishes to temporarily close existing roadways, or reroute traffic along existing roads or along detour roads not specifically required to be constructed under the Contract, the Contractor shall first obtain written approval from the Engineer and the written consent of the appropriate parties having jurisdiction. Work which so closes or alters the use of existing roads and streets shall not be undertaken until adequate temporary provisions for traffic have been provided or arranged for by the Contractor, and appropriate approvals have been obtained. The route of detour shall be properly signed and delineated. The cost of all such Work shall be borne by the Contractor.

E.5.9.1.5. The Contractor shall erect or place, and maintain in good condition, barricades, temporary warning and directional signs, lights, approved electric flasher units, traffic cones, traffic drums, and other warning and danger signals and devices, as appropriate and adequate for the specific needs, at working sites, closed roads, intersections, open excavations, locations of material storage, standing equipment and other obstructions; at points where the usable traffic width of the road is reduced; at points where traffic is deflected from its normal courses or lanes; and at other places of danger to vehicular or pedestrian traffic or to completed Work. All such warning and danger signals and devices shall be established or relocated, repaired and replaced in such manner and at such time and places as may be necessary for adequate protection of vehicular and pedestrian traffic, subject to the approval of local, state and federal authorities having jurisdiction. All such traffic protective devices shall at all times remain the property of the Contractor and shall be removed from the site when no longer needed, except when the Contract specifically states that the devices are to remain in place and become the property of the Authority.

E.5.9.1.6. The Contractor shall provide and station competent flagmen whose sole duty shall consist of directing the movement of public traffic through and around the Work. The Contractor shall additionally provide sufficient watchmen and shall take all other

precautions that may be necessary for the safety of the public and protection of the Work including any which may be ordered by the Engineer. Watchmen shall patrol periodically, and replace missing, damaged or defective traffic control devices.

E.5.9.1.7. The Contractor will coordinate all lane closings and openings with the Delaware River Port Authority Police ("Authority's Police"). The Contractor shall request the Authority's Police assistance in setting up the closure through the Engineer. The Engineer will advise the Authority's Police. The Authority's Police will escort the Contractor's vehicles into the closure area and will temporarily divert, slow or halt traffic during the Maintenance and Protection of Traffic set-up and breakdown. The Contractor shall protect the Authority's Police during set-up/breakdown with a Truck Mounted Attenuator equipped with a flashing arrow panel.

E.5.9.1.8. The Authority's Police and, if necessary, Bridge Operations may, in the event of a serious accident or major traffic demand, declare an emergency condition without any advance notice. The Contractor is required in such case to cooperate fully and immediately with the directions received, which may include ceasing operations and clearing the Work area. No extra payment for such an occurrence will be made by the Authority. The Contractor shall not make a claim for damages against the Authority for such an occurrence. What constitutes an emergency is at the sole direction of the Authority.

E.5.9.1.9. Whenever the Contractor's vehicles operate in lanes open to public traffic, travel shall always be with and not against or across traffic. Contractor vehicles shall enter and leave Work areas in a manner which will not be hazardous to or interfere with traffic. Persons violating these traffic rules will be subject to a summons by the Delaware River Port Authority Police.

E.5.10. BLASTING AND THE USE OF EXPLOSIVES

E.5.10.1. The bringing of explosives and other hazardous materials within the Project limits and the performance of any blasting shall not be conducted without the prior written permission of the Engineer.

E.5.10.2. When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, and approved in writing by the Engineer, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

E.5.11. SAFETY AND FIRST AID REQUIREMENTS

E.5.11.1. The Contractor shall adhere to the Authority's Safety Administrative Manual with respect to the safety of persons, environment, public and property. In the event of a conflict between any provision therein and any other applicable law, rule, regulation, code or standard, the more stringent requirement shall apply.

E.5.11.2. The Contractor shall perform all Work with due regard to the safety of persons and property. It is a condition of this Contract, and the Contractor agrees that it shall be made a condition of each Subcontract entered into pursuant to this Contract, that the Contractor and any subcontractor shall not permit any laborer or mechanic to Work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to their health and safety, as determined under the most current provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, as well as any applicable OSHA regulations and the Authority's Safety Administrative Manual, to the extent not in contravention of applicable laws.

E.5.11.3. The Contractor shall keep records of all accidents. These records shall include all data as may be required by the Departments of Labor of the respective states in which the Work is being performed.

E.5.11.4. The Contractor shall prepare a site specific safety plan which identifies all hazards and provides procedures and practices that will be implemented to safely perform the Work in accordance with the Safety Administrative Manual, OSHA regulations, the most current version of the Manual of Accident Prevention in Construction and all other applicable federal, state and local rules, laws and regulations. In the event of a conflict between these provisions, the more stringent requirement shall prevail. The site-specific safety plan shall be submitted for review by the Engineer and the Authority's safety personnel. The Contractor shall not commence any on-site Work until the site specific safety plan has been approved and written notification provided to the Contractor.

E.5.11.5. The site specific safety plan shall be used by the Contractor to guide and control the performance of the Work at the job site, so as to

preserve safe Work practices and safe working conditions for all persons who may be present at the job site, including Contractor and subcontractor employees, delivery persons, Authority employees and representatives, and the public at large.

E.5.12. SANITARY PROVISIONS

E.5.12.1. The Contractor shall provide and maintain in a neat and sanitary condition, and properly secluded, such toilet accommodations for himself and its employees as may be necessary to comply with the regulations of OSHA, the State Departments of Health, and other bodies having jurisdiction thereof. No public nuisance will be tolerated. Toilets shall be kept clean and in a sanitary condition at all times. All such accommodations and connections shall be removed upon completion of the Contract and the premises shall be left clean.

E.5.12.2. Care shall be taken to keep all parts of the Work in a sanitary condition and free from refuse and decaying or other objectionable, unsafe, or unhealthy matter.

E.5.12.3. At the end of each Work day, the Contractor shall leave the construction area in clean and organized manner acceptable to the Engineer. The Contractor shall provide and maintain covered trash receptacles for use by its employees.

E.5.13. ENVIRONMENTAL REGULATIONS

E.5.13.1. The Contractor shall execute all Work in an environmentally acceptable and lawful manner. Operational techniques shall be used which avoid pollution of the environment and which are acceptable to appropriate regulatory agencies. All federal, state and local environmental laws, rules and regulations must be complied with at all times. The Contractor shall contact the appropriate regulatory agencies, determine their requirements and develop and employ suitable means, methods and techniques that comply with environmental requirements.

E.5.13.2. Environmental protection, in general, requires the complete containment, collection and legal disposal of all materials classified as hazardous by appropriate regulatory agencies. The Contractor must contain, collect and legally dispose of all trash, materials and waste generated by the Contractor's execution of the Work. The Contractor shall utilize operational techniques which will ensure compliance with all federal, state and local environmental protection requirements for containment, collection and legal disposal of hazardous materials.

E.5.13.3. The determination and definition of hazardous material is the sole domain of the regulatory agencies and cannot be addressed by the Authority.

E.5.13.4. The Contractor shall determine all costs of compliance with environmental requirements before submitting its bid and shall include said costs in its bid. No separate or additional payment will be made to the Contractor for costs of complying with environmental regulations. The Contractor shall be responsible for any fines and assessments imposed by a governmental agency which were caused by the Contractor's failure to comply with environmental laws.

E.5.14. CONTRACTOR PARKING PERMIT

E.5.14.1. The Contractor will be issued temporary parking permits by DRPA/PATCO for all Contractor's vehicles, including the personal and company vehicles of the Contractor's representatives, employees, and subcontractors which are authorized to park on DRPA/PATCO property.

E.5.14.2. All vehicles driving and/or parking on DRPA/PATCO property shall possess a valid registration, current inspection sticker, and insurance coverage.

E.5.14.3. Prior to being issued the temporary parking permits, the Contractor shall provide DRPA/PATCO with a list of all such vehicles, including name of the registered owner, name of the operator if different from the owner, the automobile type (car, van, truck, suv), make, model year, color, license plate number, and state of registration.

E.5.14.4. Temporary parking permits shall be valid for 90 calendar days, or until the completion of the Project, which ever period is less.

E.5.14.5. Upon expiration of the temporary permit, the Contractor shall be issued new parking permits for another 90 calendar days, or until completion of the Project, whichever period is less.

E.5.14.6. The Contractor shall be responsible for collecting and destroying all parking permits upon expiration, or completion of the Project.

E.5.14.7. Temporary parking permits shall be hung from the rear view mirror with the information on the permit facing the windshield, and be visible from the outside of the vehicle.

E.5.14.8. Failure to display parking permits in the prescribed manner may lead to the vehicle being ticketed, towed and/or impounded at the

direction of DRPA/PATCO police. The owner/operator of any vehicle towed or impounded for failing to display a valid parking permit, shall be responsible for paying all towing and storage costs and fees levied by the towing company.

E.5.14.9. DRPA/PATCO will not be responsible for any damages which occur as a result of a vehicle being towed and/or impounded for violation of these parking provisions. The Contractor shall indemnify and hold harmless the DRPA/PATCO, its agents, and employees from any and all damage that may be caused by the removal from DRPA/PATCO property of vehicles owned and/or operated by the Contractor, its agents, employees or subcontractors, for failure to properly display a valid DRPA/PATCO parking permit, and/or for parking in a restricted or "no parking" area, consitant with the provisions of E.39.

E.5.15. CONFIDENTIAL AND PRIVILEGED/SECURITY SENSITIVE INFORMATION (CPSI/SSI)

E.5.15.1. For all projects designated by the Authority as CPSI/SSI projects, the Contractor shall comply with SP.29. and SP.30. (if applicable) and all additional requirements as prescribed by the Department of Homeland Security.

E.5.16. INDEMNITY PROVISIONS FOR VIOLATION OF LAW/PROJECT SAFETY

E.5.16.1. Contractor agrees to perform the Work in a safe and proper manner so as to comply with all laws, codes, regulations and ordinances related to or governing the Work and will indemnify, defend and hold the Authority and Engineer harmless against all penalties for violation of the same and any and all liability, damage, loss, claims, demands, actions and expenses, including, without limitation, attorneys' fees, expert fees, and costs incurred in connection therewith.

E.5.16.2. The general administration of the Work by the Engineer is for the sole purpose of representing the Authority's interests, in determining that the Work is being properly executed. Although the Engineer may provide Contractor with assistance and direction in prosecuting the Work, such action will not relieve the Contractor from any responsibility for the Work, including, without limitation, responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work. In no event shall Authority or the Engineer be liable to the Contractor, either in contract, tort, strict liability, by statute or otherwise, for any costs or damages, whether

asserted directly against the Authority or Engineer or by way of indemnification, in whole or part, arising in any way out of, relating to or resulting from any act, direction, supervision, instruction or coordination furnished to the Contractor by the Authority or Engineer or the failure to furnish same, which, directly or indirectly, affects the performance of the Contractor.

E.5.17. NIGHT WORK

E.5.17.1. The Contractor shall perform all Work during normal daylight, unless the Contract provides otherwise. If necessary, the Contractor may seek the approval of the Engineer to perform Work at night. If the Contractor performs Work at night, the Contractor shall not be entitled to any additional payment solely arising out of said night work.

E.5.17.2. Nighttime operations shall be illuminated by a lighting system, which shall provide the construction area with a minimum illumination intensity of ten foot-candles and shall be positioned and operated to preclude glare to approaching traffic.

E.5.17.3. All vehicles and equipment used for nighttime operations shall have a minimum of 72 square inches of high intensity reflective sheeting toward the extremities of each side of the vehicle or equipment. A minimum of 144 square inches of the sheeting shall be visible from each direction.

E.6. RIGHTS AND RESPONSIBILITIES OF ENGINEER

E.6.1. DETERMINATION MADE BY ENGINEER

The Engineer shall make all necessary interpretations as to the meaning of the Contract Drawings and Specifications; shall give all orders and directions necessary for the prosecution of the Work within the scope of this Contract; shall determine in all cases the quantity, quality, acceptability and fitness of the several kinds of Work as performed by the Contractor, or the materials furnished under this Contract; and shall decide every technical question which may arise relative to the fulfillment of this Contract by the Contractor.

E.6.2. DECISIONS FINAL, CONCLUSIVE AND BINDING

The Engineer's estimates and decisions shall be considered as final, conclusive, and binding upon the Contractor on any questions pertaining to the Contract which may arise between the parties hereto. Such estimates and decisions shall be a condition precedent to the right of the Contractor to receive any money under this Contract.

E.6.3. **NOT RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS**

The Engineer and the Authority shall not be responsible to the Contractor for, and shall not have control or charge of, construction means, methods, techniques, sequences or procedures, or the safety precautions and programs in connection with the Work, and the Engineer and the Authority shall not be responsible to the Contractor for the Contractor's failure to carry out the Work in accordance with the Contract Documents. Further, the Engineer and the Authority shall not be responsible in any way to the Contractor for the acts or omissions of the Contractor, and any subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

E.6.4. **ENGINEER'S INSPECTIONS**

E.6.4.1. The Engineer may delegate certain individuals as "Inspectors" and designated assistants representing the Engineer. These Inspectors and assistants shall be authorized to inspect all Work done and all materials furnished, take measurements, determine all quantities of Work done as provided in the Contract Documents, and make periodic estimates of the Contractor's Work, and report to the Engineer as to the progress of the Work and the manner in which it is being performed by the Contractor.

E.6.4.2. The Inspectors and designated assistants shall also report to the Engineer if the Work performed by the Contractor fails to fulfill the requirements of the Contract Documents. Such Inspectors and assistants shall call to the attention of the Contractor any such failure or other infringement. Such inspection, or lack thereof, however, shall not relieve the Contractor from any obligation to perform the Work in strict accordance with the requirements of the Contract Documents.

E.6.4.3. In case of any dispute as to materials furnished or the manner of performing the Work, the Inspector shall have the authority to suspend Work until the question at issue can be referred to and decided by the Engineer. However, the Inspectors and designated assistants to the Engineer shall not be authorized to revoke, alter, enlarge, relax or release any requirements of the Contract Documents, or to approve or accept any portion of the Work, or to issue instructions contrary to said Contract Documents. Any advice which the Inspectors and assistants may give the Contractor shall in no way be construed as binding on the Engineer or on the Authority, nor shall such advice relieve the Contractor from fulfillment of the terms of the Contract.

E.6.4.4. In no event shall the Inspectors and designated assistants act as foremen or perform other duties for the Contractor, nor shall they interfere with the management of the Work by the Contractor.

E.6.4.5. The duties, responsibilities and limitations of authority of the Engineer as set forth in the Contract Documents may be restricted, modified or extended by the Authority without consent of the Contractor. The Engineer does not have authority to waive or restrict any of the Authority's rights and/or remedies under the Contract Documents nor expand the Authority's obligations under the Contract Documents.

E.6.4.6. If the employment of the Engineer is terminated, the Authority may employ a successor Engineer whose status under the Contract Documents shall be that of the Engineer.

E.7. UNCOVERING OF WORK AND CORRECTION OF THE WORK

E.7.1. If a portion of the Work is covered contrary to the Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Engineer or the Authority, be uncovered for the Engineer's examination and be replaced at the Contractor's expense without change in the Contract Time.

E.7.2. If a portion of the Work has been covered which the Engineer has not specifically requested to examine prior to its being covered, the Engineer may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Authority's expense. If such Work is not in accordance with the Contract Documents, correction shall be at the Contractor's expense unless the condition was caused by the Authority or a separate contractor in which event the Authority shall be responsible for payment of such costs.

E.7.3. **CORRECTION OF WORK**

E.7.3.1. The Contractor shall promptly correct Work rejected by the Engineer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense. If the Contractor, a subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical

device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Authority.

E.7.3.2. The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Authority.

E.7.3.3. The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Authority or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

E.7.3.4. Upon failure of the Contractor to immediately correct, remove or replace rejected, defective, non-conforming or unauthorized Work, or to immediately comply with any order of the Engineer made under the provisions of this Section E.7.3., the Engineer shall have authority to cause such rejected, defective, non-conforming or unauthorized Work to be corrected or removed and replaced, and the costs thereof, as well as those incurred in storing any rejected materials, shall be deducted from any monies due or to become due the Contractor. If the payments then or thereafter due the Contractor are not sufficient to cover such costs, the Contractor shall pay the difference to the Authority. The Authority reserves the right, should defective or unauthorized Work or materials used by or on the part of the Contractor be discovered, either before or after the Project has been accepted, or even after Final Payment has been made, to claim and recover by process of law such sums as may be sufficient to correct, remove or replace the rejected, defective, non-conforming or unauthorized Work or materials. The Authority may also recover costs of bringing claim or suit, including, but not limited to reasonable attorney's fees and expert costs.

E.7.3.5. This clause shall have full effect regardless of the fact that the rejected, defective, non-conforming or unauthorized Work may have been performed, or the defective materials used, with the full knowledge of the Engineer and/or the Authority. The fact that the Engineer and/or the Authority may have previously overlooked such defective Work shall not constitute an acceptance of any part of it by the Authority.

E.7.4. ACCEPTANCE OF NONCONFORMING WORK

E.7.4.1. If the Authority prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Authority may do so instead of requiring its removal and correction, in which

case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

E.7.4.2. The Authority reserves the right to use or cause to be used, any portion of the Work which, in the opinion of the Engineer, is in condition to be used, even if not formally approved or accepted. Such use does not constitute or imply acceptance of the Work involved.

E.8. CONTRACTOR'S CONSTRUCTION SCHEDULE

E.8.1. The Contractor, within ten (10) days after being awarded the Contract, shall prepare and submit for the Authority's and Engineer's information the Contractor's construction schedule for the Work. The schedule shall not exceed time limits required under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor's construction schedule shall be in a detailed, precedence-style critical path method ("CPM") or other format satisfactory to the Authority and the Engineer and shall (i) provide a graphic representation of all activities and events that will occur during performance of the Work; (ii) identify each phase of construction and/or occupancy; and (iii) set forth dates that are critical to ensure the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents ("Milestone Dates"). By submitting its construction schedule to the Authority and the Engineer for review and acceptance, the Contractor warrants and represents that all durations in the schedule are realistic and reflect the actual time it will take to perform the Work properly. Upon review and acceptance by the Authority and the Engineer of the Contractor's construction schedule, the accepted Contractor's construction schedule shall be called the "Baseline Schedule" and shall be deemed part of the Contract Documents. If not initially accepted by the Authority and the Engineer, the Contractor shall promptly revise the Contractor's construction schedule in accordance with the comments of the Authority and the Engineer and resubmit the schedule for acceptance. Under no circumstances shall the Contractor be entitled to any payment or to begin construction at the Project site until the Contractor's construction schedule has been accepted by the Authority and the Engineer, and becomes the Baseline Schedule. The Contractor shall monitor the progress of the Work for conformance with the requirements of the Baseline Schedule and shall promptly advise the Authority of any delays or potential delays. On a monthly basis and in conjunction with its Applications for Payment, the Contractor shall submit to the Authority and the Engineer updates to the Baseline Schedule showing the current, actual status of the Work and any deviations from the Baseline Schedule ("Schedule Updates"). Contractor's failure to submit accurate Schedule Updates in accordance with this Section shall be a material breach of the Agreement. In the event any Schedule Update indicates any delay or delays to the Project, the Contractor shall propose an affirmative plan to recover

any time lost from any delay or delays, including overtime and/or additional labor, if necessary. The submission by the Contractor of a Schedule Update showing a delay to the Project shall not, in and of itself, entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time. The Contractor shall only be entitled to an extension of the Contract Time by complying with the procedures set forth in these General Provisions. The Authority's review and/or acceptance of the Contractor's construction schedule shall not be deemed to constitute control over the Contractor's construction means and methods or schedule duration or logic.

E.8.2. Each and every construction schedule, including the Baseline Schedule and Schedule Updates shall contain a sworn and verified statement that provides: "Our company understands that the meeting of the milestone dates listed in this schedule is critical to maintaining the Project schedule and meeting the Substantial Completion Date of each phase. In signing this schedule, our company agrees to this schedule and further agrees to dedicate whatever resources that are required to complete the Work of our Contract in order to meet these deadlines."

E.8.3. In the event the Authority determines that the Contractor's performance of the Work has not progressed or reached the level of completion required by the Contract Documents and that such conditions are not the result of a delay for which the Contractor is entitled to an extension of the Contract Time pursuant to E.9.8., the Authority shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Authority's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Baseline Schedule.

E.8.3.1. The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Authority under or pursuant to this Section E.8.3.

E.8.3.2. The Authority may exercise the rights furnished the Authority under or pursuant to this Section E.8.3. as frequently as the Authority reasonably deems necessary to ensure that the Contractor's performance of the Work will comply with the time requirements.

E.8.4. The Authority shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operation of the Authority's premises or any customers or invitees thereof, or the performance of any other project(s). The Contractor shall, upon the Authority's written request, reschedule any portion of the Work affecting operation of the premises or the performance of any other project(s). Any postponement,

rescheduling, or performance of the Work under this Section E.8.4. may be grounds for an extension of the Contract Time, provided that the Contractor complies with the procedures set forth in these General Provisions.

E.8.5. The Contractor shall prepare a submittal schedule within ten days (10) promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Engineer's and Authority's approval. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Engineer reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

E.8.6. The Contractor shall perform the Work in general accordance with the Baseline Schedule and Schedule Updates, submitted to and approved by the Authority and Engineer.

E.8.7. The Baseline Schedule and Schedule Updates are required in order to safeguard the Authority's interests, and in no way shall it relieve the Contractor of its obligations or responsibilities for the safe and proper execution of the Work.

E.8.8. In the preparation of the Baseline Schedule and Schedule Updates, the Contractor shall provide adequate consideration for reasonable weather delays, review and approval periods, and other reasonably quantifiable events which may impact the schedule.

E.9. TIME

E.9.1. Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

E.9.2. The date of commencement of the Work is the date identified in the Notice to Proceed.

E.9.3. The date of Substantial Completion is the date certified by the Engineer in accordance with E.12., and approved by the Authority.

E.9.4. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

E.9.5. Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work. Expeditious performance and completion of this Contract are essential for the express purpose of enabling the Authority to maintain in public service an important transportation facility, in accordance with a predetermined program of funding and construction.

E.9.6. The Contractor shall not knowingly, except by agreement or instruction of the Authority in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Section I to be furnished by the Contractor and Authority. The date of commencement of the Work shall not be changed by the effective date of such insurance.

E.9.7. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion at the earliest possible date within the Contract Time.

E.9.8. **DELAYS AND EXTENSIONS OF TIME**

E.9.8.1. If the Contractor is delayed at any time in the commencement or progress of the Work which at the time of the delay is critical, by an act or neglect of the Authority or Engineer, or of an employee of either, or of a separate contractor employed by the Authority; or by changes ordered in the Work; or by fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or which the Contractor could not have anticipated and, by reasonable action, ameliorated the impact thereof; or by other causes which the Authority determines may justify delay, then the Contract Time shall be extended by Change Order to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time; provided, however, that the Contractor shall not be entitled to an extension of the Contract Time if the Contractor is delayed in the commencement or progress of the Work by any other cause for which the Contractor is not entitled to an extension of the Contract Time under the Contract Documents. The Contractor further agrees that no adjustments in the Contract Time will be permitted for a delay to the extent that such delay: (1) is caused by the Contractor, a subcontractor, a sub-subcontractor, a supplier, or any other person or entity providing services, materials, or equipment to any of them; (2) could have been limited or avoided by the Contractor's timely acts and/or notice to the Authority and the Engineer of the delay; or (3) is of a duration less than one day. In the event that a delay caused by the Contractor, a subcontractor, a sub-subcontractor, a supplier, or any person or entity providing services, materials, or equipment to any of them is concurrent with a delay caused by the Authority, the Contractor shall be entitled to an extension of the Contract Time, but shall not be entitled to any compensation or damages allegedly resulting from such concurrent delay, including, without limitation, consequential damages, lost opportunity costs, impact damages, or other similar remuneration.

E.9.8.2. The Contractor recognizes that delays, acceleration or hindrances may occur. No claims for increased costs, charges, expenses or damages of any kind, shall be made by the Contractor against the Authority for any delays, acceleration, hindrances, loss of

productivity, or similar claims (collectively "Delays") from any cause whatsoever, including, but not limited to, the actions or inactions of other contractors working for the Authority, strikes, walkouts, extended overhead, winter protection or Work stoppages during the progress of any portion of the Work whether or not such Delays are foreseeable. Notwithstanding anything to the contrary in this Agreement or the Contract Documents, in no event shall Contractor be entitled to any compensation or recovery of any damages in connection with any Delays, including, without limitation, consequential damages, lost opportunity costs, lost profits, impact damages, or other similar remuneration. Notwithstanding anything to the contrary in this Agreement or the Contact Documents, an extension in the Contact Time, to the extent granted under E.9.8.1. shall be the Contractor's sole remedy for any Delays.

E.9.8.3. Claims relating to time shall be made in accordance with applicable provisions of these General Requirements, and the procedures set forth below.

E.9.8.4. The Contractor's right to any time extension is contingent on the Contractor strictly complying with all of the procedures regarding Claims set forth in these General Provisions.

E.9.8.5. If the Contractor believes that it is entitled to an extension of the Contract Time, the Contractor shall submit to the Authority a written time impact analysis demonstrating the effect of a Change in the Work or a delay on the Contract Time. The Contractor's time impact analysis shall be submitted in accordance with the following procedures.

E.9.8.5.1. In situations where the Contractor seeks an extension of the Contract Time prior to performing the Work required by a Change in the Work or the initiation of a delay, the Contractor shall submit a written time impact analysis, including a narrative fragmentary CPM network (schedule fragment), demonstrating how the Contractor proposes to incorporate the Change in the Work or delay into the Baseline Schedule or applicable Schedule Update and the time impact, if any, on the Milestone Dates set forth in the Baseline Schedule or applicable Schedule Update. The Contractor's time impact analysis shall demonstrate the anticipated time impact to the Milestone Date or Dates based upon the date the Change Order applicable to the Change in the Work is issued or the date the delay initiates; the status of

construction at that point in time; and the event time computations of all affected activities. The event times used in the Contractor's time impact analysis shall be those set forth in the Schedule Update in effect at the time the Change Order is issued or the delay initiates.

E.9.8.5.2. In situations where (i) the Authority has directed the performance of Work related to a Change Order in advance of determining any time impact associated with the performance of the changed Work; or (ii) the Contractor and Authority have not yet agreed on an adjustment to the Contract Sum and/or Contract Time prior to the Authority directing the Contractor to proceed with the Work related to a Change Order; or (iii) the Contractor has provided notice of an alleged delay in the Work and incurred a delay, the Contractor shall submit a written time impact analysis, including a narrative and fragmentary CPM network (schedule fragment) demonstrating the actual effect of the Change Order or delay on the Milestone Dates. The Contractor's time impact analysis shall demonstrate the time impact to the Milestone Dates based on an "as-planned" to "as-built" comparison of (i) the event times according to the Schedule Update in effect at the time the Change Order was issued or the alleged delay initiated, to (ii) a Project "as-built" schedule which covers the period of time during which the changed Work was performed or the delay incurred. In developing the as-built schedule, the Contractor shall utilize activity "actual start" and "actual finish" date information included in the Schedule Updates, in conjunction with as-built schedule information obtained from the Contractor's daily logs, weekly meeting minutes, monthly reports, and other available sources, to graphically depict the sequence and manner in which the Contractor actually performed the Work during the time the changed Work was performed or the delay occurred. Thereafter, the Contractor shall (i) identify the as-built critical path to completion through the period of time during which the subject Change Order Work was performed or delay occurred; (ii) prepare a fragmentary CPM network (schedule fragnet) which graphically depicts the manner in which the Change Order Work was performed or delay occurred; and (iii) incorporate the

schedule fragnet into the as-built schedule demonstrating how the changed Work or delay affected the as-built critical path.

E.9.8.5.3. The Contractor recognizes and agrees to the following: (i) activity delays shall not automatically mean that an increase in the Contract Time is warranted or due the Contractor; (ii) it is possible that a modification, change, or delay will not affect projected or as-built critical activities or cause non-critical activities to become critical; (iii) a Change Order or delay may result in only absorbing a portion of the available total float that may exist within an activity chain of the applicable Schedule Update; (iv) float is not for the exclusive use or benefit of the Authority or Contractor; and (v) increases in the Contract Time will be granted only to the extent that the time adjustments to the activity or activities affected by a Change Order or delay extends the Date of Substantial Completion.

E.9.8.6. If the Contractor submits a Schedule Update or any other document indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Authority to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

E.9.8.7. If the Authority is prevented or enjoined from proceeding with Work either before or after the start of construction by reason of any litigation, injunction, or other reason beyond the control of the Authority, the Contractor shall not be entitled to make or assert a claim for damage by reason of said delay; but time for completion of the Work will be extended to such reasonable time as the Authority may determine will compensate for time lost by such delay with such determination to be set forth in writing.

E.9.8.8. Any delay attributable to lack of coordination and cooperation by and between the separate Contractors among themselves or their subcontractors will not be recognized by the Authority as the basis for any claim for an increase in any Contract Sum or Contract Time.

E.9.9. COMPLETION AND LIQUIDATED DAMAGES

E.9.9.1. The Contractor shall substantially complete all of the Work included in the Contract Documents so that the Project is ready for the Authority's occupancy or work by another contractor as defined in

E.12. within the time stated in the Contract Documents, subject to extensions of Contract Time as provided in Section E.9.8.

E.9.9.2. It is hereby understood and mutually agreed by and between the Contractor and the Authority that the date of commencement, rate of progress and the time of completion of the Work are essential conditions of the Contract Documents, and it is further understood and agreed that the Work covered under the Contract Documents shall be started on the date specified in the Authority's Notice to Proceed.

E.9.9.3. The Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterrupted at such rate of progress as will ensure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and Authority, that the time for the completion of Work described herein is a reasonable time for the completion of the same, taking into consideration the average climate range and usual industrial conditions prevailing in its locality.

E.9.9.4. If the Contractor shall neglect, fail or refuse to complete the Work within the time herein specified, or any proper extension therefore granted by the Authority, then the Contractor does hereby agree, as a part of the consideration for the awarding of this Contract, to pay to the Authority the amount specified in SP.5, not as a penalty, but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall not achieve Substantial Completion as stipulated in the Contract Documents.

E.9.9.5. The liquidated damages are fixed and agreed upon by and between the Contractor and Authority because of the impracticality and extreme difficulty of affixing and ascertaining the actual damages the Authority would in such event sustain, and said amounts shall be retained from time to time by the Authority from the current periodic payments.

E.9.9.6. The Authority's rights and remedies provided by this Section E.9.9. are not exclusive, and are in addition to any other rights and remedies provided by law or under this Contract.

E.10. CLAIMS AND DISPUTES

E.10.1. Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question

between the Authority and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

E.10.2. Notice of Claims. Claims by the Contractor must be initiated by written notice to the Authority with a copy sent to the Engineer. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes or should have recognized the condition giving rise to the Claim, whichever is later. Claims may also be reserved in writing within the time limits set forth in this Section. If a claim is reserved, the Claims and Disputes procedures described in Section E.10. of these General Provisions shall not commence until a written notice from the Contractor is received by the Engineer and the Authority. Any notice of Claim or reservation of Claim must clearly identify the alleged cause and the nature of the Claim and include data and information then available to the Contractor that will facilitate prompt verification and evaluation of the Claim. Failure to initiate a Claim in accordance with this Section shall result in an irrevocable waiver of the Claim.

E.10.3. Continuing Performance. Pending final resolution of a Claim, the Contractor shall proceed diligently with performance of the Contract and the Authority shall continue to make payments unrelated to the item in dispute in accordance with the Contract Documents.

E.10.4. **CLAIMS FOR ADDITIONAL COST**

E.10.4.1. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work and the Contractor's failure to do so shall be an irrevocable waiver of any such Claim.

E.10.5. **CLAIMS FOR ADVERSE WEATHER CONDITIONS**

E.10.5.1. If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the month or months in question, could not have been reasonably anticipated and had an adverse effect on the scheduled construction during that month or those months.

E.10.6. **CLAIMS AGAINST THE AUTHORITY'S BOARD AND EMPLOYEES**

E.10.6.1. No claim shall be made by the Contractor against any member, officer, agent or employee of the Authority or Engineer.

E.10.6.2. Third-Party Contractual Rights. It is agreed that the Authority, neither by this clause nor any other provisions in the Contract or other statement prior to or contemporaneous with the Contract creates any right or expectation in any third-party or third parties (including without limitation, subcontractors) enforceable at law or

in equity or any other proceeding against the Authority, its officers, board, subsidizers, employees, agents, or assigns.

E.10.7. **MEDIATION**

E.10.7.1. Unless waived by the Authority in writing, all Claims, disputes, or other matters in controversy arising out of or related to the Contract shall be subject to mediation as a condition precedent to the Contractor filing a lawsuit against the Authority.

E.10.7.2. The parties shall endeavor to resolve their Claims by mediation. A request for mediation shall be made in writing, delivered to the other party to the Contract. The request may be made concurrently with the filing of a complaint but, in such event, mediation shall proceed in advance of litigation, which shall be stayed pending mediation for a period of 100 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

E.10.7.3. The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in Camden, New Jersey, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

E.10.8. **CONSOLIDATION OR JOINDER**

E.10.8.1. The Authority, at its sole discretion, may consolidate litigation conducted under this Agreement with any other litigation to which the Authority is a party pertaining to the Project.

E.10.9. **JURISDICTION**

E.10.9.1. The Contractor hereby irrevocably submits himself to the jurisdiction of the Courts of the Commonwealth of Pennsylvania and to the jurisdiction of the Courts of the State of New Jersey in regard to any controversy arising out of, connected with, or in any way concerning Project or the Contract Documents.

E.10.10. **CLAIMS FOR CONSEQUENTIAL AND/OR INCIDENTAL DAMAGES**

E.10.10.1. The Contractor waives Claims against the Authority for consequential and/or incidental damages arising out of or relating to this Contract. This waiver includes, but is not limited to:

E.10.10.1.1. Consequential Damages. Consequential damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and

reputation, and for loss of actual and/or expected profit.

E.10.10.1.2. Incidental Damages. Incidental damages incurred by Contractor including, without limitation, cost resulting from stopping Work, removing and transporting Contractor property (e.g. Contractor equipment, supplies and materials) from the site, and storing Contractor's property (e.g. Contractor's equipment, supplies and materials) at an alternate location.

E.11. PAYMENT

E.11.1. Contract Sum. The Contract Sum is stated in Section D-Contract Agreement and, including authorized adjustments, is the total amount payable by the Authority to the Contractor for performance of the Work under the Contract Documents. The Contractor hereby agrees to accept the Contract Sum as full payment for performing and completing the Work; for furnishing all labor, materials, equipment, transportation and all else necessary therefor, and all incidental expenses in connection therewith; for any loss by damage to or destruction of the Work and for any other loss as provided in Section E.5.; for any additional expenses on account of unforeseen difficulties encountered; and for replacement of defective Work and materials after the acceptance of the Work by the Authority; and otherwise as provided by law and by this Contract.

E.11.2. Schedule of Values. The Contractor shall submit to the Authority and the Engineer, within ten (10) days of the Contract award a Schedule of Values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Authority and the Engineer may require. This schedule, unless objected to by the Authority or the Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Schedule of Values shall be prepared in such a manner that each major item of Work and each subcontracted item of Work is shown as a line item on AIA Document G703, Application and Certificate for Payment, Continuation Sheet. Each major item of Work shall be further broken down into separate line items for labor, materials, phase, or other description as the Authority and the Engineer may require. Any item on the Schedule of Values which fails to include sufficient detail, is unbalanced, or exhibits "front-end-loading" of the value of the Work shall be rejected. If any item on the Schedule of Values has been initially approved and subsequently used, but later, at any point before Final Payment, is found improper or undervalued/understated for any reason, sufficient funds shall be withheld from future payments to ensure an adequate reserve to complete the Work.

E.11.3. Applications for Payment. The Contractor shall submit to the Engineer an itemized Application for Payment in the form of AIA Documents G702 and G703 prepared

in accordance with the Schedule of Values for completed portions of the Work. Such application shall be notarized and supported by such data substantiating the Contractor's right to payment as the Authority or Engineer may require, such as copies of requisitions from subcontractors and material suppliers, and shall reflect retainage provided for in the Contract Documents. The Contractor is to submit each Application for Payment in such time as to meet the review and approval schedules of the Authority. Applications that are submitted late and do not meet the approval schedule will be processed the following month.

E.11.4. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

E.11.5. Prior to submitting its first Application for Payment, the Contractor must:

E.11.5.1. provide the Authority with a list of the names and addresses of all subcontractors or other parties with whom the Contractor has entered into contracts for performance of the Work;

E.11.5.2. provide the Authority with copies of all governmental permits or approvals required for the Contractor to perform its Work on the Project; and

E.11.5.3. provide the Authority with the Baseline Schedule, and receive the Authority's and the Engineer's approval of said schedule.

E.11.6. For each of the Contractor's Applications for Payment, including, but not limited to the first, the Contractor must provide the following:

E.11.6.1. a copy of the monthly Schedule Update submitted in conjunction with the Contractor's Application for Payment;

E.11.6.2. any invoices, purchase orders, or other statements evidencing the amount sought by the Contractor in its Application for Payment for "time and material" Work;

E.11.6.3. a list showing any changes or additions to the list of subcontractors or other parties with whom the Contractor has entered into contracts for the performance of the Work;

E.11.6.4. original, notarized, partial release of claims on a form acceptable to and approved by the Authority for the Contractor and all subcontractors, sub-subcontractors, material suppliers, or other entities to be paid out of any funds received in response to the Application for Payment;

E.11.6.5. copies of all third-party inspection, testing, and other reports obtained by the Contractor during the period covered by the Application for Payment; and

E.11.6.6. any MBE/WBE status reports, safety reports, and/or other documents required in the Contract Documents.

E.11.7. If approved in advance in writing by the Authority, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance in writing by the Authority, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Authority to establish the Authority's title to such materials and equipment or otherwise protect the Authority's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

E.11.7.1. The aggregate cost of materials stored off site shall not exceed $500,000 at any time without written approval of the Authority.

E.11.7.2. Title to such materials shall be vested in the Authority, as evidenced by documentation satisfactory in form and substance to the Authority including, without limitation, recorded financing statements, UCC filings, and UCC searches.

E.11.7.3. With each Application for Payment, the Contractor shall submit to the Authority and the Engineer a list identifying each location where materials are stored off the Project site and the value of the materials at each location. The Contractor shall procure insurance satisfactory to the Authority for materials stored off the Project site in an amount not less than the total replacement value of the materials.

E.11.7.4. The consent of any surety shall be obtained to the extent required prior to payment for any material stored off the Project site.

E.11.7.5. Representatives of the Authority and/or the Engineer shall have the right to make inspections of the storage areas at any time.

E.11.7.6. Such materials shall be (i) protected from destruction, theft, and damage to the satisfaction of the Authority (ii) specifically marked for as for use on the Project, and (iii) segregated from other materials at the storage facility.

E.11.7.7. Provide any other documentation reasonably requested by the Authority regarding materials or equipment stored off site.

E.11.8. The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Authority no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Authority shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of subcontractors, sub-subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work, and that all subcontractors or sub-subcontractors performing such Work have been paid and that Contractor knows of no existing or threatened claims by any party against the Authority or the Project.

E.11.9. Applications for Payment.

E.11.9.1. Based upon monthly Applications for Payment including all supporting documentation submitted to the Authority and Engineer by the Contractor and Certificates for Payment properly issued by the Engineer, the Authority shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

E.11.9.2. The period covered by each Application for Payment shall be one calendar month ending on the last day of the month immediately preceding the month in which an Application for Payment is received.

E.11.9.3. Provided a proper and complete Application for Payment is received by the Engineer and the Authority not later than the thirtieth (30th) day of a month, the Authority shall make payment to the Contractor not later than the thirtieth (30th) day of the following month. If a proper and complete Application for Payment is received by the Engineer after the application date fixed above, payment shall be made by the Authority not later than thirty (30) days after the Engineer receives and approves the Application for Payment.

E.11.9.4. The Contractor's entitlement to payment for each of its Payment Applications is expressly conditioned upon the Contractor's fulfillment of all of the requirements set forth in E.11.5. and E.11.6.

E.11.9.5. The Contractor acknowledges and agrees that the Authority may, but is not obligated to, make payment on any Application for Payment to any subcontractor directly, provided that financial difficulties prevent the Contractor from making timely payments.

E.11.9.6. Notwithstanding anything to the contrary in the Contract Documents, in no event shall the Authority be obligated to make payment on any Application for Payment to the Contractor until a

written certification has been executed and delivered by the Contractor to the Authority that states:

(a) the construction of the Work to date has been performed in a good and workmanlike manner and in accordance with the Plans, and progress thereof is such that the Work will be completed by the date of Substantial Completion;

(b) the amount for which such advance is requested either has been paid by the Contractor or is justly due to the Contractor for Work, labor or material furnished for the construction of the Work insofar as actually reported therein (or stored on the Project site as approved by the Authority) up to the date of such Application for Payment (for the first Application for Payment) or up to the date of such Application for Payment from the date of previous Application for Payment; and

(c) no part of the Work described in such Application for Payment has been made the basis for any previous payment.

E.11.9.7. Each Application for Payment shall be based on the most recent Schedule of Values submitted by the Contractor in accordance with the Contract Documents.

E.11.9.8. Applications for Payment shall show the proper percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

E.11.9.9. Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

E.11.9.9.1. take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the Schedule of Values. Pending final determination of cost to the Authority of changes in the Work, amounts not in dispute shall be included;

E.11.9.9.2. if approved in advance by the Authority, add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work, suitably stored off the site at a location agreed upon in writing.

E.11.9.9.3. subtract the aggregate of previous payments made by the Authority;

E.11.9.9.4. subtract the shortfall, if any, indicated by the Contractor in the documentation required to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Authority's accountants in such documentation; and

E.11.9.9.5. subtract amounts, if any, for which the Engineer has withheld or nullified a Certificate for Payment, not including retainage described in E.11.9.10. and E.11.9.11. of this Agreement properly held by the Authority at the time of each progress payment.

E.11.9.10. The Authority shall be entitled to withhold as retainage ten percent (10%) of the Contract Sum included in each Application for Payment until the Work is fifty percent (50%) completed. At that time, the retainage shall be reduced to five (5%) percent for the remaining Work.

E.11.9.11. Prior to achieving Substantial Completion, the Authority, the Contractor, and the Engineer shall conduct a walk-through of the Project and shall jointly prepare and execute a written punch list of items of Work that the Contractor needs to complete and/or repair ("Punch-List items"). Upon the achievement of Substantial Completion, the Authority shall release all remaining retainages due to the Contractor hereunder, except for an amount, as reasonably calculated by the Authority equal to 200% of the cost of such remaining Punch-List Items: provided, however, that no retainage shall be released unless the cost of Punch-List Items (before calculating the 200%) is less than one-half percent (1/2%) of the Contract Sum. These remaining retainage amounts shall be released to the Contractor when all Punch-List Items are certified by the Engineer, and approved by the Authority as completed.

E.11.9.12. Except with the Authority's prior approval, payments to subcontractors shall be subject to retainage of not less than ten percent (10%). The Authority and the Contractor shall agree upon a mutually acceptable procedure for review and approval of payments and retention for subcontractors.

E.11.9.13. No advanced billings will be considered for payment. Any Application for Payment which includes advanced billings will be rejected and not processed for payment.

E.11.10. Certificates of Payment. The Engineer will, within ten (10) days after receipt of the Contractor's Application for Payment, either issue to the Authority a Certificate for Payment, with a copy to the Contractor, for such amount as the Engineer determines is properly due, or notify the Contractor and Authority in writing of the Engineer's reasons for withholding certification in whole or in part.

E.11.10.1. The issuance of a Certificate for Payment will constitute a representation by the Engineer to the Authority, based on the Engineer's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Engineer's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Engineer. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Engineer has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from subcontractors and material suppliers and other data requested by the Authority to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

E.11.11. Decision to Withhold Certification. The Engineer may withhold a Certificate for Payment and the Authority may decline to make payment in whole or in part, to the extent reasonably necessary to protect the Authority, if in the Engineer's opinion the representations to the Authority required by Section E.11.10.1. cannot be made. If the Engineer is unable to certify payment in the amount of the Application, the Engineer will notify the Contractor and Authority as provided in Section E.11.10. If the Contractor and Engineer cannot agree on a revised amount, the Engineer will promptly issue a Certificate for Payment for the amount for which the Engineer is able to make such representations to the Authority. The Engineer may also withhold a Certificate for Payment and the Authority may decline to make payment or, because of subsequently discovered evidence or subsequent observation may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Engineer's opinion to protect the Authority from loss for which the Contractor is responsible, including, but not limited to:

E.11.11.1. defective Work not remedied;

E.11.11.2. third-party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Authority is provided by the Contractor;

E.11.11.3. failure of the Contractor to make payments properly to subcontractors or for labor, materials or equipment;

E.11.11.4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

E.11.11.5. damage to the Authority or a separate contractor;

E.11.11.6. reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

E.11.11.7. failure to carry out the Work in accordance with the Contract Documents;

E.11.11.8. failure to comply with governmental laws, ordinances, rules and regulations;

E.11.11.9. incomplete application for payment;

E.11.11.10. materials claimed by Contractor to be on site or incorporated into the Work and found not to be on site or incorporated into the Work;

E.11.11.11. erroneous estimates by Contractor of the value of the Work performed; and/or

E.11.11.12. Work performed, but which is not done in accordance with the Contract Documents.

E.11.12. When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

E.11.13. If the Engineer withholds Certification for Payment, the Authority may, at its sole option, issue joint checks to the Contractor and to any subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Authority makes payments by joint check, the Authority shall notify the Engineer and the Engineer will reflect such payment on the next Certificate for Payment.

E.11.14. Progress Payments. After the Engineer has issued a Certificate for Payment and if the Authority has agreed to the amount certified and has accepted the Work certified by the Engineer, the Authority shall make payment in the manner and within the time provided in the Contract Documents.

E.11.15. The Contractor shall pay each subcontractor no later than fourteen days after receipt of payment from the Authority the amount to which the subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each subcontractor, require each subcontractor to make payments to sub-subcontractors in a similar manner. Notwithstanding anything in this Section to the contrary, if the Contractor's financial condition prevents it from making payment to any subcontractor, the Authority may elect, in the Authority's sole discretion, to make any payment that the Contractor requests be made to a subcontractor payable to such subcontractor. In no event shall any such payment be construed to create any (i) contract between the Authority and any subcontractor, (ii) obligations from the Authority to such subcontractor, or (iii) rights in such subcontractor against the Authority. To the extent that the Contractor withholds any portion of a payment to a subcontractor, the Contractor must promptly provide a written explanation to the Authority.

E.11.16. The Engineer and/or the Authority will, on request, furnish to a subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Engineer and Authority on account of portions of the Work done by such subcontractor.

E.11.17. The Authority shall have the right to contact subcontractors to ascertain whether they have been properly paid by the Contractor. Neither the Authority nor the Engineer shall have an obligation to pay or to see to the payment of money to a subcontractor.

E.11.18. Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections E.11.15., E.11.16., and E.11.17.

E.11.19. A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Authority shall not constitute acceptance of Work not in accordance with the Contract Documents.

E.11.20. Failure of Payment. If the Authority is entitled to reimbursement or payment from the Contractor pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Authority. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to make promptly any payment due to the Authority, or if the Authority incurs any costs and expenses, including attorney fees, to cure any default of the Contractor or to correct Work that was not performed in accordance with the Contract Documents, the Authority shall have the right to offset such amount against the Contract Sum and may, in the Authority's sole discretion, elect either to (i) deduct an amount equal to that which the Authority is entitled from any payment then or thereafter due the Contractor from the Authority, of (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Authority is entitled.

E.11.21. **INTEREST**

E.11.21.1. Contractor hereby waives any right the Contractor has or may have to interest on payments from the Authority not timely made.

E.11.22. **TAXES**

E.11.22.1. The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor accepts full responsibility for the payment of all contribution and taxes imposed by the laws of the United States or by the laws of any state or city and which are measured by wages, salaries or other remuneration paid to persons employed by the Contractor for the Work or for materials and equipment used in the performance of the Work.

E.11.22.2. The Authority expects the Contractor to claim tax exemptions for items which are tax exempt.

E.11.22.3. The Authority expects all tax exemption to be incorporated into bids.

E.11.22.4. The Authority will cooperate with the Contractor's obtaining tax exemptions by executing applicable governmental forms.

E.11.22.5. The Contractor shall check all materials, equipment and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Contract, and the system shall be satisfactory to Authority. Such accounts shall be sufficient to support a request for refund of sales and use tax. The Authority or its representative shall be afforded access to all of the Contractor's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to this Contract, and the Contractor shall preserve all such records for a period of ten years, or for such longer period as may be required by law, after the final payment.

E.11.22.6. The Contractor agrees to assign and transfer to the Authority all of its rights to sales and use tax which may be refunded as a result of a claim for refund for materials purchased in connection with this Contract. The Contractor further agrees that it will not file a claim for refund for any sales or use tax which is the subject of this Assignment. The Contractor shall cooperate with and assist the Authority in obtaining any refund of sales and use tax for the Authority's benefit.

E.11.22.7. The Contractor agrees to include the language of E.11.22.5. and E.11.22.6. (with the word Contractor changed to "subcontractor") in all of its subcontracts.

E.12. SUBSTANTIAL COMPLETION

E.12.1. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Authority can occupy or utilize the Work for its intended use and, in addition, all requirements of the Contract Documents for Substantial Completion, including the following conditions, have been fulfilled:

(a) the Contractor has delivered to the Engineer all written warranties and related documents required by the Contract Documents;

(b) the Contractor has obtained approval from all agencies having jurisdiction over the Work, or any designated portion of the Work, and obtains appropriate Certificates of Occupancy for the Work, or designated portion of the Work; and

(c) the cost to complete all Punch List items, as reasonably determined by the Engineer, is one-half percent (1/2%) or less of the Contract Sum to complete the Project, as applicable.

E.12.2. In no event, however, shall the Work, or any designated portion thereof, be substantially complete until: (a) at least 95% of the Work, or designated portion thereof, has been completed (for the purpose of determining when 95% of the Work, or any designated portion thereof, has been completed. Work does not include the Contractor's overhead and profit, general conditions, or supervision); (b) in determining the value of Work, the Engineer will use the value in the Schedule of Values for the Work or the cost of the Authority to complete the Work, whichever is greater.

E.12.3. When the Contractor considers that the Work, or a portion thereof which the Authority agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Engineer a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

E.12.4. Upon receipt of the Contractor's list, the Engineer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Engineer's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Authority can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon

notification by the Engineer. In such case, the Contractor shall then submit a request for another inspection by the Engineer to determine Substantial Completion.

E.12.5. When the Work or designated portion thereof is substantially complete, the Engineer will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion for the Work or designated portion thereof, shall establish responsibilities of the Authority and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate, which time shall be no longer than (30) days.

E.12.6. The Certificate of Substantial Completion shall be submitted to the Authority and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon acceptance of the Certificate of Substantial Completion for the entirety of the Work and consent of surety, if any, the Authority shall make payment of retainage applying to the Work. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

E.12.7. If, after the Engineer issues the Certificate of Substantial Completion, subsequent information discloses that Substantial Completion has not been achieved, the Engineer or Authority, after three (3) days written notice to Contractor, will revoke the Certificate of Substantial Completion. If the Certificate of Substantial Completion is revoked, liquidated damages as set forth in the Contract Documents will be assessed from the date that Substantial Completion was to have been achieved under the Contract Documents until the date the Engineer or Authority determines that Substantial Completion has been achieved as though the revoked Certificate of Substantial Completion had never been issued.

E.12.8. The Authority shall have the right to retain out of monies due or to become due the Contractor any amounts claimed by the Authority to be due the Authority from the Contractor.

E.12.9. In the event of any conflicting Claim or Claims concerning the right to receive payments which may be or become due from the Authority under the terms of this Contract, the Authority may withhold an amount equal to that amount in dispute until such dispute(s) are finally resolved by a court of competent jurisdiction.

E.13. FINAL COMPLETION AND FINAL PAYMENT

E.13.1. Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will promptly make such inspection and, when the Engineer finds the Work acceptable under the Contract Documents and the Contract fully performed, the Engineer will promptly issue a final Certificate for Payment stating that to the best of the Engineer's knowledge, information and belief, and on the basis of the Engineer's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found

to be due the Contractor and noted in the final Certificate is due and payable. The Engineer's final Certificate for Payment will constitute a further representation that all conditions precedent to the Contractor's being entitled to final payment have been fulfilled.

E.13.2. Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Engineer in form and substance satisfactory to the Authority (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Authority might be responsible (less amounts withheld by Authority) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days after prior written notice has been given to the Authority, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4), final prints of the record drawings marked by the Contractor with as-built information, and (5) if required by the Authority, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Authority. If a subcontractor or sub-subcontractor refuses to furnish a release required by the Authority, the Contractor may furnish a bond satisfactory to the Authority to indemnify the Authority against such claims. If any claims remain unsatisfied after payments are made, the Contractor shall promptly pay to the Authority all money that the Authority may be compelled to pay in defending against such claim, including all costs, attorneys' fees, and expert fees.

E.13.3. Acceptance of final payment by the Contractor, a subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified in writing by that payee as unsettled at the time of final Application for Payment.

E.13.4. When all Work required under this Contract has been completed, and in the opinion of the Engineer, is ready for final acceptance by the Authority, a final Certificate of Payment will be made by the Engineer.

(a) When this final certificate is approved, and the Contractor has no claims against the Authority, the money due the Contractor for the performance of the Work, as determined by said final certificate, after deduction of previous payments on account, will be paid the Contractor, provided, however, that before such final payment is made, the following requirements shall be satisfied:

1. There shall be no outstanding claims against the Contractor filed with the Authority;

2. The Contractor shall have paid all due obligations and shall have furnished, when directed by the Chief Executive Officer or his Duly Authorized Representative, receipted bills or other satisfactory evidence that all obligations incurred by the Contractor and by its subcontractors, in carrying out the Work, have been satisfied;

3. The Contractor has submitted all drawings, other documents and materials required to be submitted to the Authority in compliance with applicable law and the Contractor's obligations under the Contract;

4. The Contractor has executed and delivered both Contractor and subcontractor final releases of claims; and,

5. The Contractor shall deliver a Consent of Surety to final payment issued by the Surety Company.

E.13.5. **ACCEPTANCE OF WORK NO WAIVER**

E.13.5.1. Neither the acceptance by the Authority, the Engineer, or any of their employees, of any order, measurement, certificate, or acceptance of the whole or any part of the Work, nor any possession taken by the Authority or its employees, shall operate as a waiver of any portion of this Contract, or of any power herein reserved to the Authority, or of any right to damages herein provided. Furthermore, any waiver of any breach of this Contract shall not be held to be a waiver of any other or subsequent breach of this Contract.

E.14. SUSPENSION OF WORK

E.14.1. The Authority may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Authority may determine.

E.14.2. The Contract Time may be adjusted for increases in the time, if any, caused by suspension, delay or interruption as described in Section E.9.8. No adjustment shall be made to the extent:

E.14.2.1. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor, a subcontractor, a sub-subcontractor, or any other person or entity for which one of them is responsible; or

E.14.2.2. that an adjustment is made or denied under another provision of the Contract.

E.14.3. If the Work is suspended, delayed, or interrupted for a period in excess of four (4) months, then when the Work can proceed, the Contract prices for the Work shall

be adjusted by negotiation between the parties hereto, using the construction cost indices of the Engineering News-Record and prevailing pertinent wage scales as the basis for the adjustment.

E.15. ANNULMENT OF CONTRACT

E.15.1. In the event of a national or state-wide emergency, construction is stopped, either directly or indirectly, by any federal or state agency, or when the Authority deems it advisable in the interests of the Authority, the Authority may annul the Contract, without liability, upon written notice by the Authority to the Contractor at least thirty (30) calendar days prior to such annulment.

E.15.2. Unless the Contractor is in default at the time of annulment under this Section E.16., Final Payment will be made in accordance with Section E.13. for the cost of the Work properly completed pursuant to the terms and conditions of this Contract. No payments under this Section E.15., however, shall be made for any claim for loss of anticipated profits.

E.15.3. Upon annulment of the Contract under this Section E.15., the Authority may require the Contractor to promptly remove any or all of its equipment and supplies from the site of the Work or other property of the Authority. Failure of the Contractor to comply with this requirement, shall entitle the Authority, in its discretion, to cause such equipment and supplies to be removed and stored at the expense of the Contractor.

E.16. TERMINATION FOR DEFAULT

E.16.1. After giving the Contractor five days prior written notice, the Authority may terminate the Contract if the Contractor:

E.16.1.1. refuses or fails to supply enough properly skilled workers or proper materials or fails to prosecute the Work for five consecutive business days, or fails to prosecute the Work promptly and diligently to ensure completion of the Work in accordance with the Contract;

E.16.1.2. fails to make payment to subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the subcontractors or otherwise materially breaches its obligations to the subcontractor under the Subcontract;

E.16.1.3. disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

E.16.1.4. fails to comply with the requirements regarding insurance set forth in Sections C and I;

E.16.1.5. makes a general assignment for the benefit of its creditors, admits in writing its inability to pay its debts as they become due, permits a

receiver, trustee or custodian to be appointed on account of its insolvency, files a petition for relief under the federal Bankruptcy Code, or if a petition for relief is filed against the Contractor by its creditors under the federal Bankruptcy Code, such petition is not vacated within thirty (30) days of the filing of the petition;

E.16.1.6. knowingly submits any document to the Authority or the Engineer that the Contractor knows is false or misleading;

E.16.1.7. fails to obtain the performance and payment bonds required by the Contract Documents;

E.16.1.8. fails to provide an acceptable schedule within thirty (30) days of Notice to Proceed; or,

E.16.1.9. otherwise is in breach of any other provision of the Contract Documents.

E.16.2. When any of the above reasons exist, the Authority may, without prejudice to any other rights or remedies of the Authority, terminate employment of the Contractor and may:

E.16.2.1. Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

E.16.2.2. Accept assignment of Subcontracts; and/or

E.16.2.3. Finish the Work by whatever reasonable method the Authority may deem expedient. Upon written request of the Contractor, the Authority shall furnish to the Contractor a detailed accounting of the costs incurred by the Authority in finishing the Work.

E.16.3. When the Authority terminates the Contract for one of the reasons stated in Section E.16.1., the Contractor shall not be entitled to receive further payment.

E.16.4. If the Engineer's services and expenses made necessary by the termination of the Contractor for default, and other damages incurred by the Authority, including attorney's fees, and not expressly waived, exceed the unpaid balance of the Contract Sum, the Contractor and surety shall pay the difference to the Authority within twenty (20) days of written demand therefore. This obligation for payment shall survive termination of the Contract.

E.16.5. If the Authority terminates the Contractor for cause, and if Contractor or surety challenges said termination, and if said termination is determined to be justified, in addition to and without prejudice to any other right or remedy which the Authority may obtain under the Contract Documents and pursuant to law, the Authority shall be entitled to payment by Contractor and surety of all reasonable attorney's fees,

expert fees, legal expenses, and legal costs incurred by the Authority. This provision does not create any right to the Contractor or surety or to any other person or entity for payment of their attorney's fees or legal costs or legal expenses.

E.16.6. If it is later determined in litigation that the termination under E.16. is deemed wrongful, the termination will be converted to and governed by E.17., termination for convenience.

E.17. TERMINATION FOR CONVENIENCE OF AUTHORITY

E.17.1. The Authority may, at any time, terminate the Contract, in whole or in part, for the Authority's convenience and without cause.

E.17.2. Upon receipt of written notice from the Authority of such termination for the Authority's convenience, the Contractor shall:

(a) cease operations as directed by the Authority in the notice;

(b) take actions necessary, or that the Authority may direct, for the protection and preservation of the Work; and

(c) except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Subcontracts and purchase orders and enter into no further Subcontracts and purchase orders.

E.17.3. Upon such termination, the Contractor shall receive, as its sole remedy, the cost of the Work properly completed pursuant to the terms and conditions of the Contract and the cost of properly and timely fabricated materials that were ordered, delivered and stored in accordance with the Authority's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits. The Authority shall be credited for (i) payment previously made to the Contractor for the terminated portion of the Work, (ii) claims that the Authority has against the Contractor under the Contract, and (iii) the value of the materials supplies, equipment, or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

E.17.4. Should the Authority terminate for cause, and that termination later be determined to be improper or unjustified, the termination shall automatically be deemed to have been, and converted to be, a termination for convenience. The Contractor shall no have no right to damages for a termination for cause. In addition, should the Authority terminate for convenience, and later a basis develops that would have justified a termination for cause, the Authority may convert the termination to a termination for cause. In the event of a termination for convenience, the Contractor shall be responsible for any Work subsequently discovered to be defective or not in compliance with Plans, Specifications, and/or Contract Documents.

E.17.5. Notwithstanding anything in the Contract Documents or otherwise to the contrary, should the Contract be terminated prior to Substantial Completion, any and all of

Contractor's required warranties and obligations to correct the Work shall commence on the date of the termination and shall survive such termination.

E.17.6. The Contractor shall include in all of its Subcontracts related to the Work, a termination for convenience clause substantially similar to this Section E.17.

E.18. ACCESS TO WORK

E.18.1. The Authority and its Engineer and their assistants and subordinates and all persons bearing the authorization of the Authority shall have access at any time to the Work and the premises used by the Contractor, and to any plant or place where material is being made or stored for the Work.

E.18.2. The Authority and its authorized representatives and agents shall at all times have access to and be permitted to observe and review all Work, materials, equipment, payrolls, accounting records, Project records, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to the Contract.

E.18.3. The Authority shall have the right to request that a complete cost analysis be prepared by the Contractor for any, or all, items which comprise the Work or a portion thereof. The cost analysis shall be prepared in accordance with Federal Transit Administration requirements.

E.19. AUTHORITY'S RIGHT TO STOP THE WORK

E.19.1. If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents or fails to carry out Work in accordance with the Contract Documents, the Authority may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Authority to stop the Work shall not give rise to a duty on the part of the Authority to exercise this right for the benefit of the Contractor or any other person or entity. Any such order issued by the Authority which is determined to have been inappropriate shall not be deemed a breach of this Agreement by the Authority; but shall be deemed to be a suspension for the convenience of the Authority as provided in Section E.14.

E.19.2. The Authority's failure to stop the Work shall not in any way limit or otherwise modify the Contractor's obligations to perform the Work in accordance with the Contract Documents. The foregoing rights of the Authority shall be in addition to those rights set forth in Section E.14. hereof and any other rights the Authority may have at law, in equity, or under the Contract Documents.

E.19.3. In no event shall the Authority have control over, charge of, or any responsibility for construction means, methods, techniques, or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted to the Authority in the Contract Documents.

E.20. AUTHORITY'S RIGHT TO CARRY OUT THE WORK

E.20.1. If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents (including, but not limited to, cleaning up), or takes any action or omits to do anything which endangers safety or proper construction, or risks damage or injury to persons or property, and fails within a seven-day period after receipt of written notice from the Authority to commence and continue correction of such default or neglect with diligence and promptness, the Authority may, without prejudice to other remedies the Authority may have, correct such deficiencies. In such case, the Authority shall have the right to deduct from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Authority's expenses and compensation for the Engineer's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Authority. The Authority shall have the right to reject Work that does not conform to the Contract Documents. The foregoing rights of the Authority shall be in addition to and not a limitation on any other rights of the Authority granted in the Contract Documents or at law or in equity.

E.21. AUTHORITY NOT RESPONSIBLE FOR CONTROL OF CONTRACTOR'S EMPLOYEES

The Engineer and/or Authority shall not have the right to hire or fire employees of the Contractor or any subcontractors, nor the right to control the manner in which any employee of the Contractor does his or her Work. The Authority, however, has the right to demand that the Contractor and/or subcontractor remove and/or replace the Contractor's and/or subcontractor's employees from the Project for any reason, including their failure to follow any Contract provision and/or adhere to any safety requirement.

E.22. RIGHTS AND RESPONSIBILITIES OF CONTRACTOR

E.22.1. OBLIGATIONS OF THE CONTRACTOR

As further provided elsewhere in the Contract Documents, the Contractor must prosecute the Work in an orderly and efficient manner using sufficient manpower and equipment to ensure timely completion of the Work. The construction schedule, operations and workday shall be coordinated with DRPA and PATCO operations, as directed by the Engineer. The Contractor shall furnish all labor and materials, plant, power, tools, and transportation necessary or proper for performing and completing the Work in the manner and within the time herein specified, and the Contractor shall perform at its own expense everything mentioned as its duty under this Contract and all incidental Work; shall pay all fees for permits, all royalties and fees for patented appliances, products, or processes used, and all other incidental expenses; shall assume all risks, loss or damage arising out of the Work; and shall construct and complete the Work in accordance with the Contract Documents and to the satisfaction of the Engineer. Furthermore, notwithstanding the fact that a

dispute, controversy or other question may have arisen between the parties hereto relating to the execution or progress of the Work, the interpretation of the Contract Documents, the payment of any monies, the delivery of any materials, or any other matter whatsoever, the Contractor shall not be relieved of its obligations under these Contract Documents, pending determination of such dispute, controversy or other question.

E.22.2. Contractor recognizes the relationship of trust and confidence established between it and the Authority by the Contract. Contractor covenants and agrees with the Authority to furnish its best skill and judgment and to cooperate with the Authority and Engineer in serving the best interest of the Authority.

E.22.3. **REVIEW OF CONTRACT DOCUMENTS**

Execution of the Contract by the Contractor is a representation that the Contractor has: (1) visited the site, (2) become familiar with local conditions (including local codes, availability of labor and materials and union work rules) under which the Work is to be performed, (3) correlated personal observations with requirements of the Contract Documents, and (4) determined that the Contract Documents are sufficient to enable the Contractor to perform the Work and to achieve Substantial Completion by the Substantial Completion Date set forth in the Agreement, at a cost that does not exceed the Contract Sum. The Contractor also represents that prior to executing the Agreement, the Contractor has walked and visually inspected the Project site, and visually inspected the existing improvements and satisfied itself as to the conditions thereof and reviewed all data and reports pertaining to the site and the Project and any such improvements as provided by the Authority or the Engineer.

E.22.4. Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Authority, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Authority and the Engineer any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in writing. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

E.22.5. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Authority and the Engineer any nonconformity discovered by or made known to the Contractor as a request for information in writing.

E.22.6. If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Authority and the Engineer issues in response to the Contractor's notices or requests for information, the Contractor may make Claims as provided in Section E.10. If the Contractor fails to perform the obligations of Sections E.22.4. and E.22.5., the Contractor shall pay such costs and damages to the Authority as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Authority or Chief Engineer and the Engineer for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities unless the Contractor either (1) recognized such error, inconsistency, omission or difference and failed to report it to the Chief Engineer and the Engineer or (2) reasonably should have recognized such inconsistency and failed to report it to the Chief Engineer and the Engineer.

E.22.7. **ALL RISKS ASSUMED BY CONTRACTOR**

E.22.7.1. The Contractor shall assume and bear all risks of loss or damage to the Work, to Work under construction by others, to existing structures, or to any part thereof or to any of the materials, plant, tools, appliances, supplies, or other things used in doing the Work prior to its final acceptance, including damage or loss to furnished or rented equipment, and shall assume and bear all risks of accidents, occurrences, death of a person or persons, personal injuries, occupational or other diseases or afflictions which may arise from or out of operation under this Contract, whether such operations are conducted by the Contractor or any subcontractor, or by anyone directly or indirectly employed by either of them. Any such loss or damage shall be made good by the Contractor at its own cost, and the Work shall be carried forward by him in accordance with this Contract without additional cost to the Authority by reason of such loss or damage.

E.22.8. **SUPERVISION AND CONSTRUCTION PROCEDURES**

E.22.8.1. The Contractor shall supervise and direct the Work, using its best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, safety precautions and programs in connection with the Work, and for coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for

the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Authority and Engineer and shall not proceed with that portion of the Work without further written instructions from the Authority or the Engineer. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Authority and/or the Engineer shall be responsible for any loss or damage arising solely from those required means, methods, techniques, sequences or procedures. The Contractor shall give the Work constant attention necessary to facilitate the progress thereof, and shall cooperate with the Engineer and with other contractors authorized to perform Work adjacent to or within the physical limits of the Contract.

E.22.8.2. When required by the Chief Engineer, the Contractor shall maintain an office at the site, with adequate provision for receiving and delivering messages, at all times, from commencement until completion of the Work. At all times when the Work is in progress, the Contractor shall keep a competent representative or superintendent on the Work site, who shall have full authority to receive and execute orders. Additionally, complete and current copies of Contract Drawings and Specifications shall be kept at such site office at all times, and individual copies of drawings shall be kept at locations where they apply after Work at a location has been started.

E.22.8.3. The Contractor shall furnish the Engineer and its inspectors with every reasonable facility for ascertaining whether the Work is being performed by the Contractor in accordance with the requirements of the Contract.

E.22.8.4. The Contractor shall furnish, construct and maintain all necessary walkways, platforms, ladders, stairways and other facilities of usual and suitable character and adequate strength to provide properly for all operations of construction and inspection of Work under the Contract.

E.22.8.5. In any Work that is required to be inspected or approved by any public authority, the Contractor shall cause such inspection or approval to be performed so as not to delay the progress of the Work. No inspection performed or failed to be performed shall be a waiver of any of the Contractor's obligations hereunder or to be construed as an approval or acceptance of the Work or any part thereof.

E.22.8.6. The Contractor shall be responsible to the Authority for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its subcontractors.

E.22.8.7. The Contractor shall send its qualified representative to periodic meetings held at such time and at such place as the Engineer or the Authority shall designate.

E.22.9. LAWS AND REGULATIONS

E.22.9.1. The Contractor shall observe and comply with all federal and state laws, rules and regulations, and local ordinances, that affect those engaged or employed on the Work, the materials or equipment used, or the conduct of the Work.

E.22.9.2. By entering into the Agreement, the Authority does not consent, either expressly or impliedly, to the jurisdiction or application of any laws, regulations, procedures or requirements of any governmental, quasi-governmental or other political entity which would otherwise not be applicable to the Authority.

E.22.10. PERMITS AND LICENSES

E.22.10.1. The Contractor shall obtain from the appropriate authorities, all permits or licenses necessary to perform the Work, shall pay any fees or charges required, and shall be responsible for conducting the operations in accordance with the provision of such permits. Copies of all permits secured by the Contractor shall be filed with the Authority and the Engineer.

E.22.11. PATENTED DEVICES, MATERIALS AND PROCESSES

E.22.11.1. The Contractor shall enter into a suitable legal agreement with any patentee or owner of any design, device, material or process covered by letters of patent or copyright, expressly providing for its use by the Contractor.

E.22.11.2. The Contractor and surety shall indemnify and hold harmless the Authority, and affected third party or political subdivision, from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright.

E.22.11.3. In addition to and inclusive of the above provision, the Contractor and surety shall indemnify the Authority for all costs, expenses, and damages, including reasonable attorney's fees, which the Authority

may be obliged to pay by reason of any infringement by the Contractor at any time during the prosecution or after completion of the Work, provided that the Authority gives prompt notice in writing to the Contractor of the institution of legal proceedings against the Authority and permits the Contractor through its counsel to defend the same, and gives the Contractor all reasonable information, assistance and authority to enable the Contractor to do so.

E.23. LABOR AND MATERIALS

E.23.1. The materials, equipment, manufactured articles, or processes described in the Contract Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution. No substitution will be considered unless written request for approval has been received by the Engineer at least twenty (20) days prior to the performance of the Work involving the proposed substitution. Each request by the Contractor for a substitution is to be submitted to the Engineer with a complete description of the proposed substitution, including drawings, cuts, performance and test data, and any other information required by the Engineer to perform its evaluation. A statement setting forth any changes in other materials, equipment, or other Work, which incorporation of the proposed substitution would require, shall also be provided by the Contractor. If the substitution is approved by the Authority and such approval results in a change in the Contract Sum, such change shall be processed as a Change Order. Notwithstanding anything to the contrary in this Section, the Authority shall have the absolute right to require the use of the materials, equipment, manufactured articles, or processes specified in the Contract Documents.

E.23.2. Materials shall conform to manufacturer's standards in effect at the date of execution of the Agreement and shall be installed in strict accordance with manufacturer's direction. The Contractor shall, if required, by the Authority or Engineer, furnish satisfactory evidence as to the kind and quality of any materials.

E.23.3. In connection with the procurement of labor and materials under this Contract, the parties to this Contract hereby agree:

E.23.3.1. In hiring of persons for the performance of Work under this Contract or Subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies, or services to be acquired under this Contract, neither the Contractor, any of its subcontractors, nor any person acting on behalf of the Contractor or subcontractor, shall discriminate against any person, by reason of age, sex, disability, religion, race, creed, color, national origin, ancestry or other classifications recognized under the laws of the United States, New Jersey and/or Pennsylvania, who is qualified and available to perform the Work to which the employment relates.

E.23.3.2. Neither the Contractor, any of its subcontractors, nor any person acting on their behalf shall discriminate in any manner against, or intimidate, any employee engaged in the performance of Work under this Contract or any Subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any materials, equipment supplied, or services to be acquired under this Contract, on account of age, sex, disability, religion, race, creed, color, national origin, ancestry or other classifications recognized under the laws of United States, New Jersey and/or Pennsylvania.

E.23.3.3. This Contract may be cancelled or terminated by the Authority and all money due or to become due hereunder may be forfeited for any violation of this Section of the Contract occurring after notice to the Contractor from the Authority.

E.23.3.4. All workmen employed by the Contractor at the site of the Work under this Contract shall be paid the prevailing rate of wages for work of a similar nature in the locality of the Work. Signs showing the wage scale shall be posted conspicuously on the site.

E.23.3.5. The Contractor shall employ only competent and efficient laborers and first-class mechanics or artisans for every kind of work, and whenever any laborer is unfit to perform his or her task, or does his or her work contrary to direction, or conducts himself or herself improperly in the opinion of the Engineer, the Contractor must remove him or her immediately and not employ him or her again on the Work. This includes forepersons, supervisors and officers of the Contractor. Workers and supervisory personnel shall be experienced in all phases of the Work to be performed.

E.24. INFORMATION SUBMITTED TO THE AUTHORITY

E.24.1. The Contractor shall submit to the Authority any information requested by the Authority or Engineer regarding materials, equipment, machinery, fixtures, and other items which the Contractor proposes to furnish and use on the Project. Furthermore, the Contractor shall provide the following information to the Engineer:

E.24.1.1. Within twenty (20) calendar days after the date of execution of this Contract by the Authority, the Contractor shall inform the Engineer, in writing, from whom and where the Contractor proposes to obtain the materials required for the Work, and thereafter shall advise the Engineer of any proposed changes. The Engineer's approval of said submission must be received by the Contractor before the materials are ordered by the Contractor.

E.24.1.2. The Contractor must notify the Engineer, in writing, of any proposed changes to the Contractor's submission under E.24.1.1., and obtain the Engineer's written approval of such change at least thirty calendar days in advance of any proposed shipment of materials from the new source.

E.24.2. WITHDRAWAL OF ENGINEER'S APPROVAL

E.24.2.1. The approval of the Engineer may be withdrawn at any time if in the Engineer's opinion the materials no longer conform to the Contract requirements. Furthermore, no material shall be used in the Work which, after approval, has in any way become unfit for its intended use.

E.24.3. SUBMISSION OF MATERIAL ORDERS

E.24.3.1. All material orders shall include a detailed description of the materials and their intended use, manner of shipment, proposed delivery date, and shall state the official designation of the Work on which they are to be used. Duplicates of material orders (except the prices) shall be furnished to the Engineer at the time the orders are placed, if requested by the Engineer.

E.24.4. SUBSTITUTION OF MATERIALS AND APPROVED EQUAL

E.24.4.1. For the purpose of concisely indicating the standard of the material requirements as to type, quality, design and finish, certain materials, may be specified as named commercial articles, or approved equal. In such case, other makes of equal grade, material properties, physical characteristics, suitability, availability and finish, may be offered by the Contractor, but substitution will be permitted only upon prior written approval by the Engineer. All requests for consideration of material substitution and approved equal shall meet the following requirements:

E.24.4.1.1. Prior to bid opening, formal requests for substitution of products and methods in place of those specified will be considered if those requests have been submitted at least ten (10) business days prior to the bid opening. If the material substitution or approved equal is deemed permissible, the allowance will be included in a duly issued Bulletin prior to the receipt of Bids.

E.24.4.1.2. Subsequent requests for substitution of products by the Contractor after Contract Award will be considered subject to approval by the Authority and Engineer. Acceptance of substitute products and

methods will be only for characteristics and use named in acceptance, and shall be interpreted neither as a modification of the Specifications and Contract Drawings requirements nor to establish acceptance of the Work. The Authority and the Engineer will be the sole judge of the quality and suitability of the substitute product and method and their decision shall be final.

E.24.4.1.3. The Contractor shall submit the following information to the Engineer to substantiate compliance of the proposed substitution with the requirements of the Specifications and Contract Drawings:

(a) Product identification, including manufacturer's name and address.

(b) Installation characteristics, installation drawings, manufacturer's literature including the product description, performance and test data, and reference standards if pertinent.

(c) Name and address of projects on which product was used under similar circumstances, and date of installation.

(d) Itemized comparison of proposed substitution with product specified. Include differences in estimated life, estimated maintenance, manufacturer's warranties, and other material differences.

(e) Data relating to changes in construction schedule.

(f) Accurate data for proposed substitution in comparison with product method specified.

(g) Cost information related to the proposed material relative to the cost of original specified material. The Contractor shall not make any claim for additional costs due to material substitution; however, the Authority reserves the right to request a credit based on approved substitutions.

E.24.4.2. In making request for substitution, the Contractor shall certify that:

E.24.4.2.1. the Contractor has personally investigated the proposed product and method; that the Contractor believes, to the best of its knowledge, information, and belief, that the product and method is either equivalent or superior to that product and method specified; and that the Contractor will update information on new or different data as it becomes known to the Contractor.

E.24.4.2.2. the Contractor will furnish at a minimum the same guarantee for the substitution as it would for the product and method specified.

E.24.4.2.3. the Contractor will coordinate installation of the accepted substitution into the Work, and will make those changes required for the Work to be complete in all aspects, at no additional expense to the Authority.

E.24.4.2.4. the Contractor waives all claims for additional costs, related to the substitution.

E.24.4.2.5. cost data is complete, including all related construction costs.

E.24.4.3. Substitutions indicated or implied on Shop Drawings or product data submittal will not be considered if no formal written request for substitution has been submitted in accordance with this Article. Requests for substitutions will not be considered if acceptance will require substantial revisions of the Contract Drawings or Specifications, or both.

E.24.5. SAMPLING AND TESTING MATERIALS

E.24.5.1. All materials furnished by the Contractor, subcontractors, and/or suppliers for use in connection with the Work, are subject to tests, or visual inspection if testing is not deemed necessary by the Engineer, for verification as to conformance to Contract Requirements. Furthermore, the Engineer may direct all materials proposed to be used to be inspected or tested at any time during their preparation and use. If, after such inspection or testing, it is found that sources of supply which have been previously approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources.

E.24.5.2. In general and unless otherwise provided in writing by the Engineer, representative samples of materials to be tested or inspected will be selected at random by the Engineer from sources or supplies provided by the Contractor. The Contractor shall provide samples, at no cost to the Authority, and shall furnish all necessary assistance to the Engineer in selecting the samples. The Authority reserves the right to order that representative samples of certain materials be delivered to the Authority, Engineer, Inspector, or to any laboratory approved by the Authority.

E.24.5.3. Samples required to be furnished or made available by the Contractor shall also be furnished or made available by the Contractor's suppliers of materials whenever tests and inspections are made at plants, quarries, mills, foundries, warehouses, shops or other points of manufacturing, treatment, fabrication, assembly or storage. Furthermore, the Contractor shall give the Authority and the Engineer such advance notice of the preparation or manufacturing of any materials as will enable the Authority or the Engineer to arrange for its inspection at the place of preparation or manufacturing. No material shall be shipped from its place of preparation or manufacturing before it has been inspected and approved when the Authority or Engineer has requested such inspection.

E.24.5.4. Samples of materials, units of manufactured items and prototypes shall be furnished in such quantities and numbers as may be required for establishing quality, classification, suitability, verification of performance, and mix formulation.

E.24.5.5. Whenever the Specifications, or other specifications referred to in the Contract Documents, require that materials be certified or tests be performed, the testing shall be conducted by an independent, third-party inspection agency/testing laboratory retained by the Contractor and approved by the Engineer. The inspection agency/testing laboratory shall be A.A.S.H.T.O. Materials Reference Laboratory (ARML) certified and experienced with the inspection and testing methods required by the Work. Laboratory certificates and a work history profile demonstrating such qualifications and experience shall be submitted to the Engineer. The cost of all material inspection and testing shall be borne by the Contractor.

E.24.5.6. Methods of testing shall be those prescribed or referred to in the Specifications for the various materials. If no methods of testing are provided for in the Specifications for a particular material, that material shall be tested in accordance with an appropriate A.A.S.H.T.O. method, or if there is no appropriate A.A.S.H.T.O.

method of testing, such materials shall be tested in accordance with an appropriate A.S.T.M. method of testing as determined by the Engineer.

E.24.5.7. Vehicles or vessels and receptacles used for shipping and transporting materials shall be strong, tight, clean and in good repair, and failure to comply with this requirement may result in rejection by the Authority or Engineer of such materials. Receptacles shall be plainly marked with the name of the producer, kind of material contained therein, net weight, and grade.

E.24.6. DELIVERY AND STORAGE OF MATERIALS

E.24.6.1. The Contractor shall cause all materials to be delivered to the job site in a manner which will assure the timely progress and completion of the Work, but will not encumber the job site unreasonably, and in accordance with any schedule or schedules therefor established from time to time by the Authority, or by the Contractor at the Authority's direction.

E.24.6.2. Materials shall be stored or stockpiled so as to ensure preservation of their quality and fitness for the Work. Material liable to damage or change in quality by the elements shall be stored in proper structures or in such other manner as may be necessary to protect them from damage. Materials shall be kept clean and free from foreign matter of any kind before, during, and after being placed in the finished Work, and provisions therefor shall be made by the Contractor.

E.24.6.3. Metal Work shall be stored on skids or otherwise placed above ground and protected against contact with rising water or mud.

E.24.6.4. A storage area will be made available to the Contractor in the vicinity of the proposed Work, for use as a construction staging and storage. The location and limits of the storage area will be designated by the Authority. The Contractor shall be responsible for the security of any storage area and any materials or equipment stored within. The Authority does not guarantee the security of these areas and will not assume responsibility for loss or damage of materials or equipment stored within.

E.24.6.5. The Contractor is responsible for returning the storage area back to the Authority in the same or better condition as originally provided for by the Authority. The Engineer will inspect, and has absolute discretion in determining whether the storage areas were returned to the Authority in an acceptable condition. The Contractor is responsible for all costs associated with restoring the storage areas.

E.24.6.6. The Contractor agrees and understands that the storage area locations may be subject to change for the good of the Project and as the progress of construction dictates. Relocation of storage areas, if required, shall be performed by the Contractor at no additional charge.

E.24.7. **REJECTED MATERIALS**

E.24.7.1. Subject also to provisions of Section E.7.4., materials not conforming to the requirements of the Contract Documents, or otherwise unacceptable to the Authority or Engineer, whether in place or not, may be rejected and shall be removed immediately from the job site, unless the Engineer shall otherwise specify in writing. Rejected materials, the defects of which have been subsequently corrected, shall not be used in the Work unless approval to do so has been given in writing by the Engineer. If the Contractor fails to remove defective materials from the job site, after notice in writing by the Engineer, the Chief Engineer may cause the defective materials to be corrected, removed and/or replaced, and the costs thereof shall be borne by the Contractor, and may be deducted from monies due or to become due the Contractor.

E.25. CONTRACTOR'S WARRANTY

E.25.1. The Contractor warrants to the Authority that all materials and equipment furnished under this Contract shall be new unless otherwise specified and approved, and that all Work shall be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these standards will, at the Authority's option, be considered defective. Furthermore, the Contractor shall guarantee the Work against defective materials and workmanship for a period of one year from the date of Substantial Completion and acceptance by the Authority. This warranty shall be in addition to, and not to be the exclusion of, any and all warranties specified in the Contract Documents and legal remedies available to the Authority. Contractor agrees to perform all Work in such manner so as to preserve any and all manufacturers' warranties.

E.25.2. The date of acceptance of the Work by the Authority shall be that date when formal inspection is made by the Engineer and/or the Authority, and the Engineer and/or Authority determines that all materials, labor and construction provided for by the Contract have been furnished and satisfactorily completed by the Contractor, and the Engineer has so notified the Contractor in writing via the Certificate of Substantial Completion.

E.25.3. If, upon such inspection by the Authority and/or Engineer, any Work is found to be unsatisfactory or incomplete in a minor respect, the Engineer shall issue the necessary instructions regarding correction of the Work such that final acceptance by the Authority may be obtained. The Contractor shall promptly comply with and

execute such instructions. The date of final acceptance as to any satisfactory portion of the Work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete Work shall be that date when the Work is corrected by the Contractor to the Engineer's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

E.25.4. If, during final inspection by the Authority and/or the Engineer, any of the Work is found to be substantially unsatisfactory or incomplete in the opinion of the Authority Engineer, a second inspection shall be made following correction, in accordance with Section E.12, and the one year guarantee shall run from the date that corrections are made and accepted by the Engineer and the Contractor so notified by the Engineer in writing.

E.25.5. If, within the one year period of guarantee, any of the Work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the Chief Engineer (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective Work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the Authority, and to the approval and satisfaction of the Chief Engineer. If the Contractor refuses or neglects to commence such corrective Work within five calendar days from the date of such demand by the Chief Engineer, or if the Contractor fails to complete such corrective Work within the time prescribed by the Chief Engineer, then the Authority shall be entitled to have the corrective Work done by others, and the costs thereof shall be borne by the Contractor or its surety.

E.25.6. The Authority reserves the right to immediately order both temporary and permanent repairs, or arrange for others to effect such repairs, if the Chief Executive Officer determines that an emergency situation is presented by the Contractor's defective Work or materials. Such temporary and permanent repairs shall be at the expense of the Contractor, and the Contractor agrees that in such event the Authority be reimbursed by the Contractor and/or its surety.

E.25.7. Nothing herein shall be construed to limit any other legal obligations of the Contractor, nor legal rights and remedies of the Authority, imposed by law or by the terms of the Contract, including those duties imposed by extrinsic documents and/or materials incorporated by reference into the Contract.

E.26. LAYOUT AND CONSTRUCTION SURVEYS AND CORRECT FIT

E.26.1. The Contractor shall establish all locations and grades of the Work and shall be solely responsible for the exact position of all parts of the Work with reference to the control points established by the Engineer. For this purpose, the Contractor shall, at its own expense, maintain and utilize its own field engineering force. The Contractor shall also furnish, at no additional cost to the Authority, all stakes, permanent bench construction, templates, instrument platforms, and other materials necessary for marking and maintaining points and lines given, and shall furnish the

Engineer such assistance as it may require in checking the layout of the Work. The Contractor shall be held responsible for the protection of all stakes and marks; if, in the opinion of the Engineer, benches or lines have been destroyed or disturbed, they shall be replaced at the Contractor's expense.

E.26.2. It is the responsibility of the Contractor to determine all existing conditions and make all necessary measurements in the field prior to ordering required materials, initiating required fabrication, or detailing features to be constructed. Correct fit for all Work shall be the responsibility of the Contractor. As noted in Section E.3.2., the Contract Drawings were prepared based on the best available information. The Contractor shall not solely rely upon the Contract Drawings but shall gather its own field data and measurements to verify the existing conditions prior to initiating Work.

E.27. SHOP DRAWINGS AND WORKING DRAWINGS

E.27.1. The Contractor shall prepare, check and submit to the Engineer for approval, such detailed Shop Drawings and Working Drawings as may be required for carrying out the Work under the Contract.

E.27.2. Shop Drawings shall show details, dimensions, sizes, materials, piece marks and other information necessary for the complete fabrication of all individual components, both temporary and permanent, which will be incorporated into the Work or utilized in connection with the Work.

E.27.3. Working Drawings shall consist of any detailed drawings, sketches and data sheets as may be required for the prosecution of the Work, including but not limited to, erection diagrams and procedures, equipment drawings, falsework, bracing, centering and formwork, masonry layout diagrams, cofferdams, lifting plans, concrete screed support points and screed elevations, catalog cuts, manufacturers' literature, manufacturers' specifications, photographs, illustrations, schedules and any other plan, drawing or product data which may be necessary for the safe and satisfactory completion of the Work.

E.27.4. Working Drawings shall show the rating of items and systems and how the components of an item and system are assembled, function together, and how they will be installed on the Project. Data and drawings for component parts of an item or system shall be coordinated and submitted as a unit. Working Drawings shall show physical arrangement, construction details, connections, finishes, materials used in fabrication, provisions for conduit entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and equipment weight. Optional items shall be clearly identified as included or excluded. Weights of equipment, components and assemblies shall be provided when required to verify the adequacy of design and proposed construction of foundations or other types of supports. Dynamic forces shall be stated for switching devices when such forces must be considered in the design of support structures. The appropriate Working Drawings shall show the

provisions for leveling, anchoring, and connecting all items during installation, and shall include any recommendations made by the manufacturer.

E.27.5. For electrical Work, Working Drawings shall include schematics or elementary diagrams of each electrical system; internal wiring and field connection diagrams of each electrical device when published by the manufacturer; wiring diagrams of cabinets, panels, units, or separate mountings; interconnection diagrams that show the wiring between separate components of assemblies; field connection diagrams that show the termination of wiring routed between separate items of equipment; and internal wiring diagrams of equipment showing wiring as actually provided for the Work. Field wiring connections shall be clearly identified.

E.27.6. The Contractor shall prepare such Working Drawings as are necessary to show in detail the temporary Work and methods of construction it proposes to use. In order to satisfy the Engineer that the plans and methods he proposes to use in constructing the Work will furnish a completed structure in strict accordance with the Contract Drawings and Specifications, and within the time limit required, the Contractor shall submit such plans to the Engineer for his examination. Such examination by the Engineer shall not relieve the Contractor of any of its responsibility to complete the construction in strict accordance with the Contract Drawings and Specifications. Erection Drawings shall show in detail or shall clearly describe temporary structures, falsework and general features and capacities of erection equipment, and shall bear the name and seal of a registered Professional Engineer, licensed in the State of New Jersey or the Commonwealth of Pennsylvania, or both, depending on where the Work is located, who shall be responsible for the design thereof.

E.27.7. The Contractor shall furnish the Engineer with four (4) full-size, scaled copies of each Shop Drawing and Working Drawing for approval, after which one copy will be returned with corrections, or marked approved. Any drawings not fully approved shall be resubmitted.

E.27.8. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Authority and Engineer that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

E.27.9. Shop Drawings and Working Drawings submitted by the Contractor will be reviewed by the Engineer, and approved or returned for re-submission, normally within twenty-one (21) calendar days. The Engineer may reject drawings and not complete the review when, in his opinion, the drawing(s) submitted are poorly drawn or of such quality as to require excessive and/or unusual effort for review.

E.27.10. The Contractor shall not order any materials and perform any Work relating to Shop Drawings and/or Working Drawings before said drawings are approval by the

Engineer. Performance of any of the Work or ordering of the materials by the Contractor, before the approval of the Shop Drawings or Working Drawings, may constitute a cause for rejection of such Work or materials by the Authority.

E.27.11. No deviations from approved Shop Drawings or Working Drawings shall be made without prior written approval of the Engineer.

E.27.12. It is expressly understood that the approval by the Engineer of the Contractor's Shop Drawings and Working Drawings relates to the requirement for design and conformance to Contract Drawings and Specifications only, and that such approval does not relieve the Contractor from responsibility for errors in drawings, including but not limited to, errors in dimensions and elevations. No approvals by the Engineer of such documents shall relieve the Contractor from the responsibility for erroneous or inconsistent dimensions, notations, omissions or the proper functioning of these materials in the completed installation.

E.27.13. Upon completion of all Work under this Contract, all materials, calculations, computations, specifications and drawings developed and prepared by the Contractor, in the performance of its services herein, shall become the property of the Delaware River Port Authority, and shall be turned over to the Authority at or prior to final payment or other termination of this Agreement, or upon written request thereof by the Authority.

E.27.14. Whenever the Contract Documents require that the Contractor submit information to the Engineer for review and approval, the requested information shall be submitted in accordance with the following requirements. Furthermore, the Contractor shall not proceed with any Work related to the submittals until approval from the Engineer has been received in writing.

A. Coordination of Submittals: Prior to each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the Contract Documents. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

B. Submittal Schedule: In accordance with Section E.8.5., within ten (10) calendar days after award of the Contract, and before any items are submitted for review, submit to the Engineer two copies of the schedule described below.

1. Compile a complete and comprehensive schedule of all submittals anticipated to be made during the progress of the Work. Include a list of each type of item for which the Contractor's drawings, Shop Drawings, Working Drawings, Certificates of Compliance, material samples, guarantees, or other types of submittals are required. Upon review and approval by the Engineer, the Contractor will be required

to adhere to the schedule except when specifically otherwise permitted.

2. Coordinate the submittal schedule with all necessary subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere.

3. Revise and update the schedule every two (2) weeks as necessary to reflect procurement delivery delays, conditions and sequences. Promptly submit revised schedules to the Engineer for review and comment. Submission of a revised schedule does not relieve the Contractor of its obligation to perform the services per the specified Contract Time.

C. Document Submittals:

1. Submit four (4) copies of all requested materials including Shop Drawings, Working Drawings, material certificates, test results, product data, brochures, circulars, catalogue cuts, manufacturer specifications, installation instructions, material safety and data sheets, and delivery tickets, etc. to the Engineer for his use and approval.

2. All drawings shall be submitted on full size 22" x 34" bond paper.

3. When approved or requested by the Engineer, submittals shall be made electronically in .pdf format.

D. Identification of Submittals:

1. Consecutively number all submittals. Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals. Include the Technical Specification section number describing the Work included in the submittal on the transmittal letter.

2. On at least the first page of each copy of each submittal, and elsewhere as required for positive identification, clearly indicate the submittal number in which the item was included.

3. When material is resubmitted for any reason, transmit under a new letter of transmittal. All resubmittals shall carry the same submittal number as the original submittal except an appendage "A", "B", "C", . . . shall be added to indicate that the material is a first, second, third, . . . submission. For example, submission 177 would indicate an original submission; 177A a second submission; and 177B, a third submission, etc.

4. Maintain an accurate submittal log for the duration of the Contract, showing current status of all submittals at all times. Make the submittal log available and provide copies of the log for the Engineer's review upon request.

E. Coordination of Submittals:

1. Prior to sending any submittal, use all means necessary to fully coordinate all material including, but not necessarily limited to:

a. Determine and verify all interface conditions, catalog numbers, and similar data.

b. Coordinate with other trades as required.

c. Clearly indicate all deviations from requirements of the Contract Documents.

2. Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.

3. Do not include copies of drawings or documents prepared by the Engineer or by other consultants in any submittal. Submittals including such copied information will be returned without review, and Contractor shall be strictly liable for delays resulting from this action.

F. Timing of Submittals:

1. Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

2. Delays caused by tardiness in the submission of submittals will not be an acceptable basis for an extension of the Contract Completion Date.

3. Provide twenty-one (21) calendar days of review time between the date of receipt of a submittal by the Engineer, and the date of return by the Engineer.

G. If submittals show variations from the Contract requirements because of standard shop practice or for other reasons, describe such variations in the

letter of transmittal. Failure to describe such variations shall not offer relief from the responsibility for executing the Work in accordance with the Contract, even though such submittals may have been reviewed. Nor shall review of any submittals by the Authority relieve the Contractor from responsibility for failure to execute Work in accordance with the Contract Documents.

H. Submittals Not in Conformance:

1. If corrections to the submittals are required, each print will be marked "REVISE AND RESUBMIT," and will show the required corrections

2. Resubmittals will be handled in the same manner as first submittals.

3. Direct specific attention, in writing or on resubmittals, to the revisions required for the particular resubmittal - do not highlight other corrections requested by the Engineer on previous submittals

4. If any corrections indicated on the submittal constitutes a change of the Contract requirements, give notice to the Engineer as required by the General Provisions.

5. Submittals determined to be inadequate or in conflict with Contract Requirements will be stamped "REJECTED," and returned to the Contractor for correction and resubmission.

I. Submittals in Conformance:

Each copy of the submittal will be identified as conforming by being stamped "APPROVED" and dated. Approval of submittals by the Authority shall not relieve the Contractor from responsibility for failure to execute Work in accordance with the Contract Documents.

J. When submittals have been reviewed by the Engineer and stamped "MAKE CORRECTIONS NOTED", the Contractor may proceed to carry out the construction in accordance with the corrections noted provided no additional changes are made. In addition, the Contractor shall make the corrections noted and resubmit the final submittal to the Engineer for his records.

Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Engineer is subject to the provisions of Section E.27.12. Informational submittals upon which the Engineer is not expected to take responsive

action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Engineer without action.

E.28. RECORD DRAWINGS

E.28.1. The Contractor shall keep at the site of the Work, a set of full-size Record Drawings and Specifications as amended or revised which shall be updated weekly, red-lined in detail, to date, to indicate the current progress of Work and such changes or additions as may be requested by the Authority or approved to suit field or other conditions; which set of drawings shall be used for no other purpose. This set of Record Drawings and Specifications shall be made available to the Engineer and the Authority for inspection upon request at any time during the performance of the Work. At the conclusion of the Contract, the Record Drawings shall be delivered to the Engineer prior to Final Payment.

E.29. SITE USE

E.29.1. The Contractor shall confine operations at the site to those areas permitted by law, ordinances, codes, rules, regulations, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

E.29.2. The Contractor and each subcontractor shall perform the Contract in such a manner as not to interrupt or interfere unduly with any operation or activity or the work of the Authority, or any other contractor or subcontractor, at or near the location of the Work.

E.29.3. The right is reserved by the Authority to do work with its own employees or by other contractors, and to permit public utility companies and others to do work during the progress and within the limits of, or adjacent to, the Work. The Contractor shall conduct its Work and cooperate with such contractors, utility companies and others so as to cause as little interference as possible with their work. Further, the Contractor shall allow such other contractors, utility companies and their agents access to their work within the site of the Work.

E.29.4. The Contractor shall and hereby does agree to make no claims against the Authority for additional compensation due to delays or other conditions created by the necessary operations of such other parties, unless such delays are markedly different in extent from those which could be reasonably anticipated for the type of work engaged in by such other parties.

E.29.5. In the event of a disagreement concerning the respective rights of the Contractor and other parties performing work within the limits of or adjacent to the Work, the Engineer will determine the respective rights of the various parties involved, in order to secure the completion of the Authority's work in general harmony and in a satisfactory manner. The Engineer's determination shall be final and binding, and shall not be cause for claims by the Contractor.

E.30. TEMPORARY BUILDINGS AND STRUCTURES

E.30.1. Buildings, fences and miscellaneous temporary structures erected by the Contractor shall be neat in appearance and acceptably painted. No advertising materials, other than Contract information and the name and address of the Contractor, shall be displayed on the Work. Further, all such advertising, its location and size, shall be subject to the approval of the Engineer.

E.31. CUTTING AND PATCHING OF WORK

E.31.1. The Contractor shall be responsible for any cutting, filling, or patching that may be required for the completion of the Work, or to ensure that its several parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

E.31.2. The Contractor shall not damage or endanger any portion of the Work, any work of the Authority, or the work of any separate contractor or subcontractor through the cutting, patching, or otherwise altering of any work, or by any excavation. Furthermore, the Contractor shall not cut, patch or otherwise alter the work of the Authority, or any separate contractor or subcontractor, except as required and authorized by the Contract Documents, or with the written consent of the Authority and of each separate contractor.

E.31.3. Where the Contractor is called upon for its written consent to the cutting or other alteration of the Work, the Contractor shall not unreasonably withhold such consent.

E.32. CLEANING UP AND RESTORATION OF CONDITIONS THROUGHOUT PROGRESS OF WORK

E.32.1. The Contractor shall at all times keep the site free from accumulation of all debris, rubbish, refuse and all unused materials and tools. Before the Work will be considered as having been completed, the site and places affected by the Work shall be thoroughly cleared and left clean and free from debris, construction plant, buildings, construction equipment, machinery, and surplus materials, and in a condition satisfactory to the Engineer.

E.32.2. If the Contractor fails to keep the premises sufficiently clean, or to clean up at the completion of the Work, the Authority may do so, and the Contractor shall reimburse the Authority for all expenses incurred in the cleaning up and restoration of the site. Additionally, the Authority shall be entitled to deduct any un-reimbursed costs thereof from any monies then or thereafter due the Contractor.

E.32.3. At the end of each Work day, the construction area is to be left in a satisfactory and clean condition. The Contractor shall provide necessary covered trash receptacles for use by its employees.

E.33. CORRESPONDENCE

The Contractor shall designate in writing a specific employee of the Contractor who shall be responsible for the receipt of all correspondence to the Contractor pertaining to the Contractor's prosecution of the Work.

E.34. INDEPENDENT CONTRACTOR

E.34.1. The Contractor shall be deemed and considered an Independent Contractor with respect to the Work covered by this Contract, and shall assume all responsibility and expense for the Work, for risks and casualties of every description arising out of the nature of the Work, including, but not limited to, the action of the elements, or unforeseen or unusual difficulties. The Contractor shall assume all liability for loss by reason of neglect or violation of federal, state or municipal laws, ordinances or regulations; loss by fire due to Work on this Contract; or from any other cause. All Work necessary to conform to such laws, ordinances, regulations and/or other applicable standards of conduct, is included in this Contract.

E.34.2. In the event of any injury to any person, or damage to any public or private property, suffered as a consequence of, or during the progress of any operations under this Contract, including any act or omission on the part of the Contractor or its agents, or employees, the Contractor shall compensate the injured party for any damage in such manner as may be required, at its own expense and cost. If the Contractor fails promptly remedy such damage, the Authority shall have the right to deduct the cost of such Work from any monies due or which thereafter become due the Contractor under this Contract, or to recover the same from the Contractor or its Surety.

E.34.3. The provisions of this Section E.34. shall be construed as in addition to, and in no way limiting, the provisions of Section E.39.

E.35. ASSIGNMENT OR SUBLET OF CONTRACT

E.35.1. The Contractor shall be the party primarily responsible to the Authority for the performance of the Contract, at all times and in all respects. The Contractor shall not sell, transfer, assign or otherwise dispose of its obligations to the Authority, or of any payment or payments which may accrue hereunder, without prior written consent of the Authority.

E.35.2. Work may be sublet by the Contractor, subject to the following provisions, and subject to the written approval of the Chief Engineer:

E.32.2.1. Requests for permission to sublet any portion of the Contract shall be made to the Chief Engineer in writing, and accompanied by proof that the organization which will perform the Work is particularly equipped and capable to perform such Work. These requests shall also define the Work to be performed by each proposed subcontractor, and the total value of such sublet Work.

E.32.2.2. When the value of the Work to be sublet to any subcontractor is Fifty Thousand Dollars ($50,000.00) or more, the proposed subcontractor must provide information required by Section A.10., "Qualification of Bidders," before the Chief Engineer will consider approving the subletting of the Work to that subcontractor.

E.32.2.3. Insurance shall be provided by the Contractor, on behalf of each subcontractor, to cover the sublet Work, in accordance with the requirements specified in Section C.5. "Insurance". Proof of such insurance shall be furnished by the Contractor to the Authority, together with the request for permission to sublet Work.

E.35.3. Sublet Work shall not begin until approval thereof has been secured from the Chief Engineer. Any consent of the Chief Engineer for the subletting of any of the Work under the Contract, however, in no way relieves the Contractor from its full obligations under the Contract. The Contractor shall be responsible for all acts or omissions of any subcontractor or supplier, and shall be liable for all damage(s) caused by acts or omissions of any subcontractor or supplier.

E.35.4. Consent by the Authority to sublet any part of the Work or obtain supplies, shall not be construed to be an approval of the said subcontract, supply contract or any of its terms; such consent shall operate only as an approval of the making of the subcontract or supply contract between the Contractor and subcontractor or supplier.

E.35.5. The provisions of this Section E.35. for assigning of this Contract by the Contractor are in addition to, and not in lieu of, other rights and responsibilities of the Contractor enumerated elsewhere in these Contract Documents.

E.36. CERTIFIED PAYROLLS

E.36.1. The Contractor shall maintain, at the Work site, a certified copy of each weekly payroll for the Contractor's and subcontractor's employees within seven days after the regular payroll date. In addition, the Contractor shall submit two (2) copies of each certified payroll to the Engineer with its monthly application for payment.

E.36.2. The Contractor may use the Department of Labor Form WH-347, "Optional Payroll Form" which provides for all the necessary payroll information and certifications. The Department of Labor form may be purchased at nominal cost from the U. S. Governmental Printing Office. However, the Contractor may use its own payroll form provided it includes the same information and certifications.

E.37. BRIDGE TOLL

E.37.1. The Authority will issue toll free passage permits for Contractor owned vehicles and equipment that are strictly used for the Work on this Project.

E.37.2. The Contractor shall furnish the Engineer with a list of license numbers and descriptions of such Contractor owned vehicles and equipment that will be used on this Project in order for the Authority to issue the required toll free passage permits to such vehicles and equipment.

E.37.3. Personal vehicles of the Contractor's employees will not receive a toll free passage permit, and shall be required to pay toll.

E.37.4. The toll free passage permit will be revoked by the Authority for any vehicle or equipment using the permit for purposes other than performance of the Work.

E.38. SUBCONTRACTORS

E.38.1. A subcontractor is a person or entity who has a direct contract with the Contractor to perform or provide a portion of the Work. The term "subcontractor" is referred to throughout the Contract Documents as if singular in number and means a subcontractor or an authorized representative of the subcontractor. The term "subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

E.38.2. A sub-subcontractor is a person or entity who has a direct or indirect contract with a subcontractor to perform or provide a portion of the Work. The term "sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a sub-subcontractor or an authorized representative of the sub-subcontractor.

E.38.3. **AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

E.38.3.1. Unless otherwise stated in the Contract Documents, the Contractor, within ten days after award of the Contract, shall furnish in writing to the Authority through the Engineer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Engineer may reply within 14 days to the Contractor in writing stating (1) whether the Authority or the Engineer has reasonable objection to any such proposed person or entity or (2) that the Engineer requires additional time for review.

E.38.3.2. The Contractor shall not contract with a proposed person or entity to whom the Authority has made objection.

E.38.3.3. If the Authority or Engineer has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Authority or Engineer has no objection. If the proposed but rejected subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such

change, and an appropriate Change Order shall be issued before commencement of the substitute subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

E.38.3.4. The Contractor shall obtain from each subcontractor a written agreement that the subcontractor shall make no claims whatsoever against the Authority, or its officers, servants, agents or employees for any Work performed or conduct or action by reason of said subcontract, or for any cause whatsoever that may arise by reason of the relationship created between the Contractor and subcontractors by the subcontract. Furthermore, said Subcontract agreement shall allow to the subcontractor, unless specifically provided otherwise in said Subcontract, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Authority.

E.38.3.5. The Contractor shall require each subcontractor to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the subcontractor's Work, which the Contractor assumes toward the Authority and Engineer. Each Subcontract agreement shall preserve and protect the rights of the Authority and Engineer under the Contract Documents with respect to the Work to be performed by the subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the subcontractor, unless specifically provided otherwise in the Subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Authority. Where appropriate, the Contractor shall require each subcontractor to enter into similar agreements with sub-subcontractors. The Contractor shall make available to each proposed subcontractor, prior to the execution of the Subcontract agreement, copies of the Contract Documents to which the subcontractor will be bound, and, upon written request of the subcontractor, identify to the subcontractor terms and conditions of the proposed Subcontract agreement which may be at variance with the Contract Documents. subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed sub-subcontractors.

E.39. INDEMNIFICATION

E.39.1. The Contractor agrees to defend, indemnify, protect and hold harmless, and tender payment to the Authority, its successors, assigns, officers, commissioners, directors, members, agents, servants and employees and the Authority's

consultants, including but not limited to the Engineer (collectively the "Indemnified Parties") from and against any and all suits, claims, liabilities, losses, expenses, judgments, demands and damages arising from claims by third parties, of whatever kind or nature, including, but not limited to, reasonable expenditures for and costs of investigations, hiring of expert witnesses, court costs, counsel fees, settlements, judgments or other expenses recoverable under applicable law, which may be suffered by or accrue against, be charged to or recoverable from the Indemnified Parties, regardless of whether a suit has been filed or initiated arising out of or resulting from the performance of the Work. This includes but is not limited to Claims caused in part by the Indemnified Parties or which are based on strict liability. However, Contractor shall not be required to defend or indemnify the Indemnified Parties for that portion of any claim, suit, action, damage or cost which is caused by the willful misconduct, reckless or grossly negligent act or omission of the Indemnified Parties

E.39.2. The defense and indemnification obligations shall arise the moment any type of demand or request for payment for is asserted against the Indemnified Parties. The obligations of the Contractor shall survive the termination of this Agreement or the completion by the Contractor of its obligations under this Agreement.

E.39.3. The Contractor shall indemnify and hold harmless all of the Indemnified Parties from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnified Parties in enforcing any of the Contractor's defense, indemnity, and hold-harmless obligations under the Agreement and or enforcing any of the Authority's right, defenses and remedies against the Contractor.

E.39.4. In the event of any such liability, damage, loss, claims, demands, actions, and expenses, including, without limitation, legal fees, or if any claim or demand for damages is made against the Indemnified Parties, the Authority may withhold from any payment due or thereafter to become due to Contractor under the terms of the Contract, an amount sufficient in the Authority's judgment to protect and indemnify the Indemnified Parties for any and all such liability, damage, loss, claims, demands, actions and expenses, including, without limitation, legal fees, or the Authority, in its discretion may require the Contractor to furnish a surety bond satisfactory to the Authority guaranteeing such protection, which bon shall be furnished by Contractor within five (5) days after written demand has been made therefore.

E.39.5. Promptly after receipt by the Authority of a notice of any claim, liability or expense, the Authority shall give timely written notice to the Contractor, but the omission to so notify the Contractor promptly will not relieve the Contractor from any liability except to the extent that Contractor shall have been materially prejudiced as a result of the failure or delay in giving such notice.

E.39.6. In claims against any of the Indemnified Parties by an employee of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for

whose acts they may be liable, the indemnification obligation under E39.. shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts, and for this purpose, the Contractor hereby waives its rights to immunity as an employer under any such workers' compensation act.

E.39.7. The obligations of Contractor shall survive the termination of this Agreement or the completion by Contractor of its obligations under this Agreement.

E.40. LEGAL ENFORCEABILITY OF CONTRACT

It is agreed by the parties to this Contract that, in the event any portion of this Contract is determined to be void or unenforceable by reason of legislation or judicial determination, all surviving portions of this Contract shall remain in full force and effect.

E.41. AUTHORITY MAY USE ALL REMEDIES

The Authority may avail itself of each and every remedy herein specifically given to it, or any remedy now or hereafter existing at law or in equity. Each and every such remedy shall be in addition to every other remedy so specifically given or otherwise so existing, and may be exercised from time to time, and as often and in such order as may be deemed expedient by the Authority. The exercise, or the commencement by the Authority of exercising a particular remedy shall not be deemed to be a waiver of the right to exercise at the same time or thereafter any other remedy.

E.42. FEDERAL, STATE, AND LOCAL REQUIREMENTS

Contractor agrees that this Contract relates to the procurement of certain labor, materials, and/or equipment that are needed for the operation of the Authority, and that the labor, materials, equipment required by this Contract are an integral part of the operations of the Authority. As a result, Contractor agrees to comply with and be bound by all applicable federal contracting requirements and state and local requirements that are set forth herein and/or may be required for the Authority to receive certain funding or obtain certain approvals.

E.43. NOTICES TO THE AUTHORITY

All notices under the Contract Documents shall be in writing and shall be deemed properly served if (a) delivered in person to the individual to whom it is addressed, (b) served by e-mail with a confirmation of receipt, or, (c) upon three (3) days after deposit in the United States mail, if sent postage prepaid by United States registered or certified mail, return receipt requested. All notices to the Authority shall be delivered to:

Chief Engineer
Delaware River Port Authority
One Port Center, 2 Riverside Drive
Camden, NJ 08103-1949

With a copy to:
General Counsel
Delaware River Port Authority
One Port Center, 2 Riverside Drive
Camden, NJ 08103-1949

E.44. IDENTIFICATION OF EMPLOYEE

In order to be designated as an authorized person for access to DRPA/PATCO property, the CONTRACTOR shall be required to have all of its representatives, employees and subcontractors wear distinctive identification badges while engaged in the Work and otherwise on the Work Site. **Each representative and employee of CONTRACTOR and subcontractor on site will be required to have a valid Transportation Worker Identification Credential (TWIC) when on DRPA/PATCO property.** Both TWIC and company badges must be displayed in a prominent manner on each person and visible at all times. The identification badge shall contain:

Front of Badge

1. Employer name;
2. Employee name;
3. Employee photo;
4. DRPA/PATCO Contract name;
5. DRPA/PATCO Contract number

Back of Badge

1. Emergency - dial '911'
2. DRPA/PATCO Police Phone No.
3. Employer Phone No.

The Contractor shall appoint a senior-management-level employee to be the company's Security Information Manager (hereinafter "SIM"). The SIM will be responsible for implementing and maintaining the employee identification procedures. The SIM will enter the employee information in the DRPA/PATCO Authorized Personnel Accountability List (APAL). The Authorized Personnel Accountability List will be updated as necessary and submitted to DRPA/PATCO Police and Homeland Security Department and members of the project team.

All visitors to the project shall report to the SIM and provide a valid driver's license and company ID to obtain a visitor's badge prior to entering the project area. This information shall be kept on file by the SIM. Visitor information shall be entered into the Authorized Personnel Accountability List. All visitors must be escorted by an authorized person.

In the event of lost or stolen employee identifications, the SIM must **immediately** contact the DRPA/PATCO Police and the Homeland Security Department.

Any person not possessing both a valid TWIC card and company identification will be immediately removed from the property by DRPA/PATCO Police and will not be permitted to return to the property until proper identification is provided.

When an employee no longer needs access to DRPA/PATCO property, the company project identification badge must be immediately retrieved and retained by the SIM and the employment end date entered into the DRPA/PATCO Authorized Personnel Accountability List.

DELAWARE RIVER PORT AUTHORITY
AND THE PORT AUTHORITY TRANSIT CORPORATION

INSURANCE REQUIREMENTS

Prior to commencement of any work under the Contract WW-32-2018, the Walt Whitman Bridge Corridor Rehabilitation, Pennsylvania approach and gantries, the Contractor shall, at its sole expense, maintain the following insurance on its own behalf with insurance companies lawfully authorized to do business in or on an admitted basis or who are an authorized insurance carrier in the jurisdiction in which the Premises is located and furnish to the DRPA Certificates of Insurance evidencing same.

1. Workers' Compensation and Employers Liability: Statutory benefits as required by the Workers' Compensation laws of the Commonwealth of Pennsylvania and the state of New Jersey and reference to such compliance made on all certificates of insurance.

    a) Workers' Compensation Coverage: Statutory Requirements

    b) Employers Liability Limits not less than:

Bodily Injury by Accident:	$1,000,000 Each Accident
Bodily Injury by Disease:	$1,000,000 Each Employee
Bodily Injury by Disease:	$1,000,000 Policy Limit

2. Commercial General Liability: Bodily Injury, Property Damage and Personal Injury (including Premises - Operations, Independent Contractors, Products/Completed Operations, Personal Injury, Broad Form Property Damage, and Explosion, Collapse and Underground Coverages) Mobile Equipment.

    a) Occurrence Form with the following limits:

    The following should be added to the definition of "occurrence"

    Notwithstanding case law holding that defective construction may not constitute as "occurrence", an "occurrence" shall include any circumstance where a defect or deficiency in "your work" results in damages because of "property damage" so long as the "property damage" was not intended by you and including but not limited to, when "your work" was performed pursuant to a contract or where damages because of "property damage" arise out of a contract.

(1)	General Aggregate:	$2,000,000
(2)	Products/Completed Operations Aggregate:	$1,000,000
(3)	Each Occurrence:	$1,000,000
(4)	Personal and Advertising Injury:	$1,000,000

    b) Products/Completed Operations Coverage must be maintained for a period of at least three (3**)** years after final payment. (as may be required by Scope of Services)

    c) The General Aggregate Limit must apply on a Per Project basis.

    d) Pollution Exclusion shall not apply to fuels, lubricants, etc. required to operate any Mobile equipment under the policy.

    e) Fellow Employee Exclusion Deleted.

3. Automobile Liability:

   a) Coverage to include:

      All Owned, Hired and Non-Owned Vehicles (Any Auto)

   b) Per Accident Combined Single Limit $1,000,000

   c) Coverage for transportation of Hazardous Materials, endorsement MCS 90 and CA 99 48 shall be provided and **reference to such compliance made on all certificates of insurance.**

4. Commercial Umbrella Liability:

   a) Occurrence Limit: $100,000,000
   b) Aggregate Limit (where applicable): $100,000,000
   c) **Policy to apply following form** of the Commercial General Liability, Commercial Automobile Liability and Employers' Liability Coverage.

5. Property, Equipment, Machinery and Owned or Leased Equipment: Contractors and all subcontractors shall maintain insurance on their owned or leased equipment, tools, trailers, etc. including coverage for DRPA's equipment used by the Contractor and/or subcontractor. Contractor is responsible for any damage to their work, materials, equipment, tools, etc. Contractor may obtain such insurance at Contractor's sole expense. If under the scope of work to be performed under the Contract there is a need to store on DRPA premises any equipment, machinery, tools, supplies or other materials, the Contractors, and their subcontractors must purchase coverage to protect these assets from loss, theft, damage or disappearance. Under no circumstances will DRPA assume any liability or otherwise offer to indemnify any party for loss, theft, damage or disappearance of such items stored on its premises throughout the duration of the Contract.

6. Professional Liability Coverage: If the Contractor performs any Professional Services that arise from the operations described under the scope of services of the Contract, the Contractor shall maintain insurance covering losses rendered by Professional Services

   a) Per Claim Limit: $1,000,000

   b) Aggregate Limit: $2,000,000

   c) If coverage is written on a Claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the Contract and that continuous coverage will be maintained or an Extended Discovery Period will be purchased for a period of one (1) year beginning when the work under the Contract is completed.

   d) If applicable, the Contractor's Industrial Hygienist providing the remedial action must provide Professional Liability coverage as set forth in the above requirements.

7. Contractors Pollution Legal Liability/Environmental Impairment Liability Insurance:
   Contractors Pollution Legal Liability/Environmental Impairment Liability Insurance in an amount no less than Fifty Million Dollars ($50,000,000) for each single occurrence to provide coverage for all necessary and reasonable costs or expenses of removing, nullifying, cleaning up, transportation or rendering ineffective, any substance which has caused environmental impairment provided, however, notice of such an occurrence must

be given the DRPA within 24 hours of said occurrence. Additionally when requested, Contractor will provide DRPA with copies of all current licenses and/or permits required by the Federal government, the State(s) or local jurisdiction(s) where the work is to be performed prior to the award contract.

8. Builder's Risk Insurance:

Such insurance shall be in an amount of $25,000,000, on a Replacement Cost Basis and such insurance shall also cover property to be incorporated into the Project stored off-site and in transit subject to a minimum limit of $10,000,000.

Contractor will purchase and maintain, throughout the life of the Project, **covering the Owner, as their interest may appear, a** Builder's Risk Policy, which shall insure against physical loss or damage to all property incorporated or to be incorporated in the Project, including temporary buildings used for storage of property to be incorporated into the Project, (trailers and other temporary offices required of the Contractor and/or subcontractors by the contract documents are not covered by this Builder's Risk Insurance) and shall cover reasonable compensation for Contractor's or subcontractor's services and expenses required as a result of such insured loss. This insurance shall not include any coverage for Contractors' or subcontractors' machinery, tools, equipment, trailers, appliances or other personal property owned, rented, or used (including all equipment that is owned by DRPA, but is being used by the contractor subcontractor) by the Contractor, or subcontractor or anyone employed by them in the performance of the work. **Owner, Contractor and all subcontractors waive all rights against each other and against each of their agents and employees, for damages caused by fire or other perils to the extent covered by insurance obtained by the Contractor.** Each Contractor and subcontractor shall require all tiers of subcontractors to waive their rights of recovery as provided in the previous paragraph against the DRPA, Contractor, and other subcontractors.

9. Self-Insured Retentions: None of the policies of insurance required of the Contractor by the Contract shall contain self-insured retentions in excess of $100,000, unless agreed to in writing by the DRPA.

10. **All policies (that offer election to purchase) shall include coverage for Certified Acts of Terrorism (TRIPRA - Terrorism Risk Insurance Program Reauthorization Act).**

11. Financial Rating and Admitted Status of Insurance Companies:

a. A.M. Best Rating: A- (Excellent) or Higher
b. A.M. Best Financial Size Category: Class VII or Higher
c. With insurance companies that are admitted or authorized to do business in the jurisdiction in which the Premises is located

12. DRPA**,** (including their agents, employees, representatives, officers, directors, members and managers) **shall be added as ADDITIONAL INSURED on all liability policies,** except for the Workers' Compensation and Professional Liability policies. The **coverage offered to the ADDITIONAL INSURED on Contractor's liability policies shall be primary coverage** to any other coverage maintained by the ADDITIONAL INSURED and shall not permit or require such other coverage to contribute to the payment of any loss. The Contractor shall determine the nature and extent of all insurance coverages necessary to afford the DRPA the full protections arising out of any subcontracted work. In addition to maintaining its own coverages as required in this Section, the Contractor represents and warrants that it shall verify that each and every subcontractor maintains

appropriate insurance coverages and limits and otherwise complies with the requirements of this Section.

13. It is agreed the Contractor's and subcontractor's insurance will be not be canceled, materially changed or non-renewed without at least thirty (30) days advance written notice to DRPA. An endorsement or the equivalent of, to all insurance policies, shall contain a 30 day notice of nonrenewal or cancellation except for non-payment of premium 10 days as provided under the PA or NJ Changes Cancellation and Nonrenewal as issued by the insurance companies and such endorsement copy should be provided with the insurance certificates.

14. Any type of insurance or any increase in limits of liability not described above which the Contractor requires for its own protection or on account of statute shall be its own responsibility and at its own expense.

15. Waiver of Recovery/Subrogation: The Contractor waives all rights of recovery and shall cause its Insurers to waive their rights of subrogation against DRPA and any of their agents and employees for loss or damage covered by any of the insurance maintained by the Contractor pursuant to the Contract.

16. The amount of insurance provided in the aforementioned insurance coverages, shall not be construed to be a limitation of the liability on the part of the Contractor or any of their subcontractors. The carrying of insurance described shall in no way be interpreted as relieving the Contractor of any responsibility or liability under the Contract.

17. The obligations of the Contractor to maintain insurance and provide Indemnification shall survive any termination of the Contract or the suspension, completion and/or acceptance of the services or any part thereof, or final payment to Contractor, it being agreed that such rights and obligations are and shall be of a continuing nature and effect.

18. Subcontractor's/Subconsultant Insurance: If any part of the work under the Contract is to be performed by a subcontractor and or a subconsultant, the Contractor shall be responsible for each subcontractor and or subconsultant maintaining insurance as specified above where applicable in paragraphs (1), (2), (3), (4), (5), (7), (10), (11), and (13); and furnish to the DRPA/PATCO for approval, Certificates of Insurance evidencing same. If any Professional Services are being performed by a subcontractor or subconsultant, the Contractor represents and warrants that it shall verify that each and every subcontractor and or subconsultant maintains Professional Liability, with limits at a minimum of:

Per Claim Limit:	$1,000,000
Aggregate Limit:	$2,000,000

DELAWARE RIVER PORT AUTHORITY
AND THE PORT AUTHORITY TRANSIT CORPORATION

INSURANCE REQUIREMENTS

If coverage is written on a Claims-made basis, the subcontractor and or subconsultant warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the Contract and that continuous coverage will be maintained or an Extended Discovery Period will be purchased for a period of one (1) year beginning when the work under the Contract is completed.

SECTION M - MBE/WBE PROGRAM

Minority-Owned Business Enterprise (MBE) & Women-Owned Business Enterprise (WBE) Program

A. STATEMENT OF PURPOSE

The Delaware River Port Authority (Authority) is firmly committed to providing equal employment and contracting opportunities for all persons regardless of race, color, religion, sex, national origin, age or non-job-related disability. In that regard, the Authority will affirmatively assure that, in regard to any Authority purchase agreement issued or Contract entered into pursuant to this project, all qualified persons will be afforded equal opportunity to participate in the contract process and will not be discriminated against on grounds of race, color, religion, sex, national origin, age or non-job-related disability.

B. DEFINITIONS

1. "Minority-owned Business Enterprise" (MBE) means a certified business which is at least 51% owned and controlled by one or more persons who are minorities, and whose management and daily business operations are controlled by one or more of the minorities who own the enterprise.

2. "Woman-owned Business Enterprise" (WBE) means a certified business which is at least 51% owned and controlled by one or more women, and whose management and business operations are controlled by one or more of the women who own the enterprise.

3. "Subcontractor" means any individual, partnership, firm, or corporation, or any acceptable combination thereof, to which the Contractor subcontracts part of the work pursuant to the applicable contract specifications.

4. "Work" means the furnishing of all labor, services, materials, equipment, tools, transportation, supplies, and other incidentals necessary or convenient to the successful completion by the Contractor of the construction described in the contract documents and the carrying out of all duties and obligations imposed by the contract documents on the Contractor.

5. “Manufacturer” - for purposes of this project, a MBE/WBE manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

6. “Regular Dealer”- for purposes of this project, a MBE/WBE regular dealer is an entity that owns, operates or maintains a store, warehouse or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock and regularly sold to the public in the usual course of business.

A "regular dealer" is a firm that engages in, as its principal business, and in its own name, the purchase and sale of the products in question. A MBE/WBE Regular Dealer in such bulk items as steel, concrete, gravel, stone and petroleum products need not keep such products in stock if it owns or operates distribution equipment.

7. MBE/WBE brokers and packagers are not regarded as MBE/WBE manufacturers or regular dealers.

8. Providers of "Bona Fide Services" - for purposes of this project, "bona fide services" include professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, **fees** charged for delivery or materials and supplies required on a job site **(but not the cost of the materials and supplies themselves)** when the MBE/WBE hauler, trucker or delivery service is not also the manufacturer of or a regular dealer in the materials and supplies.

C. MBE and WBE GOALS

1. The Contractor is hereby advised that the Authority will affirmatively assure that in regard to any Authority agreement issued or Contract entered into pursuant to this project, certified MBEs and WBEs shall be afforded every opportunity to submit proposals for consideration and will not be discriminated against on grounds of race, color, religion, sex, national origin, age or non-job-related disability.

2. The participation of certified MBEs/WBEs subcontractors and suppliers is a matter of great interest in the evaluation of all proposals. To that extent, the Authority has established the following participation goals for certified MBEs and WBEs:

MBE	WBE
8%	4%

These goals are based on a careful review of the project scope, contracting and supplier opportunities, the estimated overall dollar value of the project, and the number of ready, willing and able MBEs and WBEs in our database that may likely be able to participate on the project as a subcontractor or supplier. The goals shall serve exclusively as a guide in determining Contractor responsibility. Attainment of the goals is not a measure of responsiveness, but will be considered in measuring whether a firm is responsible contractor.

3. The total dollar value of a subcontract with a firm that is owned and controlled both by a minority and a woman shall be counted toward either the MBE goal or the WBE, but not both. The Contractor shall choose the goal to which the contract value is to be applied. DRPA will not make this election for the bidding Contractor.

4. At the time the bid/proposal is submitted, the Contractor shall submit its MBE and WBE commitments to the Authority's Office of Business Development & Equal

Opportunity. The MBE/WBE solicitation and commitment information shall be recorded on the appropriate forms included in the bid/proposal documents. The completed Solicitation and Commitment Forms shall become part of this agreement and are hereby incorporated herein by reference. Contractors who do not meet the established goals will be required, to submit evidence of their good faith efforts to solicit and commit to MBE and WBE firms.

5. The Authority may at any time require such other information or inspections as it deems necessary to determine the compliance of any Contractor with the terms and spirit of these nondiscrimination provisions. The Contractor shall fully cooperate with a compliance review in accordance with the goals and requirements specified in the contract. Unreasonable delays or failures to provide requested information or otherwise to cooperate with the DRPA may result in the withholding of contract payments and may be deemed a breach of this Contract.

D. CERTIFICATION

1. The Contractor has the sole responsibility of obtaining certified MBE and WBE firms for use on this project. Each MBE and WBE the Contractor intends to use as subcontractor(s) or supplier(s) must have a current MBE or WBE certification issued by a certifying entity recognized by the Authority. Only firms whose certification status as MBEs and WBEs is current, at the time of Contract execution, shall be recognized as certified firms.

2. The Authority does not certify firms as MBEs or WBEs. It does, however, accept certifications from various federal, state and local agencies. To confirm an agency's certification can be accepted, the Contractor is encouraged to contact the Office of Business Development and Equal Opportunity for guidance.

3. For assistance locating certified MBE and WBE firms, the Contractor is encouraged to visit the Office of Business Development & Equal Opportunity's website at www.drpa.org/obdeo. Once on the site, scroll over to the blue section on the far right-hand side and click "MBE & WBE Directory." Then click **"View the Directory"** to perform specific searches.

E. ONGOING MONITORING

1. At the pre-construction/kick-off meeting the Contractor will be required to submit a copy of a fully executed subcontract or purchase order between the Contractor and each of the MBE and WBE subcontractors/suppliers it will use on the project.

2. Each month the Contractor shall submit the original "Monthly MBE/WBE Status Report" to the DRPA Director of Engineering/Chief Engineer along with the partial payment estimate. At the same time, the Contractor shall also submit a copy of the Monthly Status Report to the DRPA's Office of Business Development & Equal

Opportunity for processing. The Monthly Status Report must be submitted each month even when no MBE and WBE subcontractors/suppliers worked.

3. Periodically, DRPA staff will conduct unannounced site visits to ensure that M/WBE firms are working on the project

4. By the fifth business day of each month the Contractor shall submit a "Monthly Project Employment Utilization Report" to the Office of Business Development & Equal Opportunity. The Contractor shall prepare a report for its aggregate workforce only. Each subcontractor (majority-owned, minority-owned, and female-owned) will be expected to prepare reports for their separate workforce(s). All forms (the ones completed by the Contractor as well as those completed by the subcontractors) are to be submitted by the Contractor to the OBD&EO as one package by the fifth business day of each month.

5. As part of the DRPA's on-going monitoring efforts, the Contractor and all subcontractors shall maintain at the job site certified payrolls which may be inspected by the DRPA, its representatives, agents and designees.

F. PAYMENTS

1. When a Contractor who has contracted with the DRPA has received a payment or payments from the DRPA for work performed, the Contractor must deliver within ten (10) calendar days from the receipt of payment from the DRPA, the proportionate share of the payment for the work performed to subcontractors specified in the contract. In the event that the Contractor has not made such payments, he or she will be required to submit a written explanation satisfactory to the DRPA for failure to make such payments.

2. Other than as required by the work to be performed for the DRPA, the Prime Contractor shall not impose upon MBE and WBE subcontractors and suppliers more restrictive insurance and bonding requirements than are placed upon other subcontractors and suppliers on the project.

G. DETERMINATION OF NON-COMPLIANCE

The following shall constitute compliance concerns:

1. documentation or information furnished by the Contractor which fails to demonstrate that MBEs or WBEs are performing the work as indicated by the Contractor on the forms included in the Contractor’s bid/proposal;

2. unreasonable failure, refusal or delay by the Contractor to furnish forms and other information requested by the Authority’s Office of Business Development & Equal Opportunity is support of its monitoring efforts;

3. discovery of information that is contrary to information previously submitted by the Contractor;

4. failure of the Contractor to execute a written contract or purchase order with its MBE and/or WBE subcontractors and suppliers;

5. failure of the Contractor to deliver to its subcontractors and suppliers within ten (10) business days, their proportionate share of the payment for the work performed; and

6. such other reasons that reasonably indicate that the Contractor is not in compliance with the Authority's MBE & WBE Program.

In the event the Authority determines it has reasonable cause to believe that a Contractor is not in compliance with the provisions of the Authority's MBE and WBE Program, the Authority's Office of Business Development & Equal Opportunity shall promptly cause written notice to be sent by mail to the Contractor. The notice shall clearly state the areas of non-compliance and require the Contractor to show cause within five (5) calendar days why it should not be found in breach of contract.

Based upon information supplied by the Contractor, if any, the Authority shall make a final recommendation as to whether the Contractor is in compliance with contract requirements. If a recommendation of non-compliance is rendered, the Chief Administrative Officer shall notify the Authority's General Counsel and make recommendations regarding appropriate remedies. The Authority's General Counsel, in consultation with the Authority's Chief Executive Officer and the Authority's Office of Business Development & Equal Opportunity, shall make a final determination regarding non-compliance and take such steps as are appropriate under the circumstances.

DELAWARE RIVER PORT AUTHORITY

Bidder:
Address:

Telephone Number:
Contact Person:

SUBCONTRACTOR & SUPPLIER SOLICITATION SHEET

Bid Date:

BID AMOUNT $

Contract No: WW-32-2018

MBE Contract Goal: **8%** WBE Contract Goal: **4%**

FAILURE TO SUBMIT THE REQUIRED INFORMATION ON SUBCONTRACTOR AND SUPPLIER SOLICITATIONS FOR MBEs AND WBEs ALIKE MAY RESULT IN REJECTION OF THE BID AS BEING NON-RESPONSIVE.

List **all** firms **MBEs and WBEs alike** solicited to perform subcontracting work or to supply materials.

FIRM NAME, ADDRESS, TELEPHONE NUMBER w/AREA CODE, AND CONTACT PERSON'S NAME AND E-MAIL ADDRESS	MBE/WBE CERTIFICATION INFORMATION (IF APPLICABLE)	TYPE OF SUBCONTRACT WORK OR SERVICES SOLICITED	DATE CONTACTED			QUOTE RECEIVED		DOLLAR AMOUNT
			PHONE	MAIL	E-MAIL	YES	NO	

PLEASE SUPPLY ANY OTHER INFORMATION WHICH MAY POSITIVELY IMPACT ON DETERMINATION OF YOUR FIRM AS A RESPONSIVE BIDDER ON ADDITIONAL SHEETS.

FORM A-199 (2-00)

DELAWARE RIVER PORT AUTHORITY

Bidder: Address: Telephone Number: Contact Person:	**MBE/WBE SUBCONTRACTOR & SUPPLIER COMMITMENT SHEET**	Bid Date: **BID AMOUNT** $ Contract No: WW-32-2018 MBE Contract Goal: **8%** WBE Contract Goal: **4%**

FAILURE TO SUBMIT THE REQUIRED INFORMATION ON THE SUBCONTRACTOR AND SUPPLIER PARTICIPATION FOR MBEs AND WBEs MAY RESULT IN REJECTION OF THE BID AS BEING NON-RESPONSIVE.

List **all MBE and WBE** firms with whom you have made tentative commitments committed to perform subcontracting work or to supply materials.

FIRM ADDRESS, TELEPHONE NO. CONTACT PERSON, AND E-MAIL ADDRESS	**MBE/WBE CERTIFICATION INFORMATION (if applicable)**	**METHOD CONTACTED**			**DESCRIPTION OF WORK PERFORMING OR GOODS SUPPLIED**	**AGREEMENT AMOUNT**
		PHONE	**MAIL**	**e-MAIL**		
						Agreement $
						Agreement $
						Agreement $
						Agreement $
						Agreement $

PLEASE SUPPLY ANY OTHER INFORMATION WHICH MAY POSITIVELY IMPACT ON DETERMINATION OF YOUR FIRM AS A RESPONSIVE BIDDER ON ADDITIONAL SHEETS.

If the contract's MBE and WBE goal is not achieved through a combination of subcontractor and supplier activity, you must supply, with your bid, evidence of your good faith efforts to use MBEs and WBEs on the project in order for a determination to be made that your firm is a responsive and responsible bidder.

SIGNATURE - AUTHORIZED REPRESENTATIVE: _____ DATE_____

FORM A-200 (2-00)

SECTION SP. SPECIAL PROVISIONS CONTENTS

SP.1. DESCRIPTION OF WORK

The Work to be completed under Contract WW-32-2018 includes the improvement and protection of the Walt Whitman Bridge corridor along I-76 in Philadelphia. The project will provide structural, civil, roadway, lighting, communication and electrical replacement, sign structure removal and replacement, and signage improvement along approximately two miles of the I-76 corridor from the area of the existing toll plaza westward to the I-76/Passyunk Avenue interchange.

The purpose of the project is to extend the serviceability of the corridor through various improvements, including pavement improvements, lighting, signage and electrical improvements, and bridge repairs. The project will also improve safety by upgrading the guide rail to current standards and providing surface drainage improvements where possible.

Improvements include pavement rehabilitation by milling and overlay, select areas of full-depth pavement reconstruction with curb replacement, minor shoulder grading, addition of drainage inlets, removal and replacement of LMC's on bridge decks, bearing rehabilitation, rehabilitation of pedestrian tunnels, installation of new light poles and electrical lines, installation of new ITS fiber optic lines, and the removal and replacement of twenty (20) sign structures.

In addition, the Work includes the removal and replacement of six (6) signal gantries A, B, C, D, I, and J on the approach spans of the Walt Whitman Bridge, located in Philadelphia, Pennsylvania and the City of Gloucester, New Jersey. The Work includes worker platform installation, removal of existing gantries, partial demolition of the existing concrete barrier, and walkway grating modifications.

The Contractor will be permitted to conduct the specified removal and replacement for the following pairs of gantries at the same time:

- Gantries A and C;
- Gantries B and I; and
- Gantries D and J

The Contractor is advised that Work at the next pair of gantries may not proceed until after all work at the previous pair of gantries is completed, the signage is operational and work has been accepted by the Authority in writing. The Work for the removal and replacement of the signal gantries needs to be Substantially Completed within the first 365 calendar days from the dated of commencement identified in the Notice to Proceed.

The Contractor is advised of the presence of communication lines, power lines, and high voltage lines located within the Work zone. The Contactor shall be required to coordinate with applicable utility companies to de-energize non-Authority owned lines when and where possible. The Contractor is advised of the presence of commercial and Authority fiber optic and Authority internal communication lines, high voltage power

lines, electrical junction boxes and other utilities on the main bridge. The Contractor shall take all precautions to ensure all fiber optic lines, electrical power lines and utilities are properly protected and shielded to ensure contract activities do not cause damage to the utilities.

The Contractor is responsible and obligated to successfully complete the entire project and to complete each and every necessary detail of every item specified and/or shown on the Contract Drawings and in the Specifications regardless of whether or not a particular detail is specifically mentioned in either the Contract Drawings or the Specifications. Any detail of Work called out on the Drawings, but not called out in the Specifications or any item of Work or detail not called out on the Drawings, but called out in the Specifications, shall be considered the same as if it was called out in both the Drawings and Specifications.

SP.2. PRE-BID CONFERENCE AND SITE VISIT

A non-mandatory Pre-Bid Conference is scheduled at the Authority Headquarters Building, One Port Center, 2 Riverside Drive, Camden, NJ. Attendance by Bidders, subcontractors, and suppliers is strongly encouraged. All bidders shall be expected to completely and thoroughly examine all Contract Documents to become fully aware of the scope and requirements of the Project prior to submitting a bid. The date and time of this Pre-Bid Conference is provided in the Event in SAP Ariba.

SP.3. INVITATION TO BID

Bids for the following Contract must be submitted electronically, via SAP Ariba. Faxed, e-mailed, and/or hardcopies will not be accepted. The Ariba submission requirement is mandatory and non-waivable.

All submissions must be made prior to the date and time stated below:

Contract Title:	Walt Whitman Bridge Corridor Rehabilitation – PA Approach
Contract Number:	WW-32-2018
Bid Due Date/Time:	Date and time is provided in the Event in SAP Ariba

Bids received after such date and time will not be considered. Bidders accept all risks of late delivery, regardless of fault. Bids properly received will be publically opened and read.

The Authority is not responsible for any costs incurred in response to this Invitation to Bid.

Bids shall be submitted in accordance with the Contract Documents. Bids shall constitute offers to the Authority which shall be binding for one-hundred twenty (120) days from the date of bid opening.

SP.4. PREVAILING WAGES/APPRENTICESHIP (INTENTIONALLY OMITTED)

SP.5. TIME OF STARTING AND COMPLETING WORK AND LIQUIDATED DAMAGES

Timely performance and completion of the Work are of the essence in this Contract. The date of commencement of the Work shall be the date fixed in the Notice to Proceed issued by the Authority. The Contract Time shall be measured from the date of commencement. The Contractor shall diligently prosecute the Work and achieve Substantial Completion of the Work no later than **930** calendar days from the date of commencement identified in the Notice to Proceed unless modified by a duly executed Change Order. If the Work is not completed in the specified time, the Contractor shall thereafter pay to the Authority liquidated damages as specified in Section E.9.9. For each and every calendar day of unexcused delay, the Contractor shall be liable to the Authority for liquidated damages in the amount of **Seventy-Five Hundred Dollars ($7,500.00)**.

Additionally, milestone duration is set for the completion of the work.

Duration Milestone #1: The duration that construction staging (Stages 1 through 2) is implemented is restricted to **two hundred and seventy (270)** consecutive calendar days. If for any reason the Contractor has not completed Stages 1 through 2 within this specified time period, liquidated damages of **$25,000** per day will be assessed for each and every day beyond the time period. There is no dollar limit to the total liquidated damages that can be assessed to the Contractor. **The duration starts with the installation of maintenance and protection of traffic (MPT) devices for Stage 1 and concludes with the removal of all MPT devices used for Stage 2 and the corridor is operating with 2 lanes of traffic in each direction within the limits of construction for Stages 1 and 2.**

The durations specified for the milestone, as well as the overall duration of the contract, may be adjusted to account for time extensions granted to the Contractor, as per Section E.4, before the liquidated damages can be imposed.

As per Technical Specification T.6, the Contractor is required to correct deficiencies of traffic control devices. The Contractor will be assessed liquidated damages for failure to correct or replace damaged devices within two (2) hours of the discovery or notification by the Engineer. Liquidated damages of **$2,000** per hour will be assessed for each and every hour beyond the two (2) hour time period.

The daily sums herein contracted to be paid by the Contractor for any default in the completion of the said work are agreed upon, not as penalties, but as partial compensation for liquidated damages which the Authority will suffer by reason of such default through loss of use of property, interest on monies borrowed, increased administrative and engineering cost, and other tangible and intangible losses. The Authority shall have the right to deduct such amounts from any monies due or which may thereafter become due to the Contractor under this Contract.

SP.6. CONTRACT DRAWINGS

The Contract Drawings issued with these Specifications and forming a part of the Contract Documents bear the title.

DELAWARE RIVER PORT AUTHORITY
CONTRACT NO. WW-32-2018
WALT WHITMAN BRIDGE CORRIDOR REHABILITATION – PA APPROACH

The Contract Drawings issued with these Specifications and forming a part of the Contract Documents are numbered and bear the titles as listed below:

Sheet Numbers	Drawing Numbers	Drawing Title
01	-	Cover Sheet
02-10	GN1-GN9	Index Map, General Notes, Index of Drawings, Control Point Data, Super Elevation Tables, and Project Coordinates
11-25	TY1-TY15	Typical Sections
26-37	DT1-DT-12	Details
38-49	SG1-SG12	Spot Elevation Plans
50-57	QY1-QY8	Summary Sheets
58-120	QY9-QY71	Tab Sheets
121-153	CP1-CP33	Construction Plans
154-238	PR1-PR85	Profile Sheets
239-271	CG1-CG33	Contour Grading and Drainage Plan Sheets
272-330	TC1-TC59	Traffic Control Plan Sheets
331-381	SP1-SP51	Signing and Pavement Marking Plans
382-483	ES1-ES102	Erosion and Sediment Control Plans
484-526	TS1-TS43	ITS Plans
527-568	LT1-LT42	Lighting Plans
569	GS1	Cover Sheet

570-571	GS2-GS3	General Notes
572	GS4	Location Maps
573-574	GS5-GS6	Schedule of Quantities
575-592	RS1-RS18	Randolph Street Overpass
593-608	SV1-SV16	Seventh Street Overpass
609-625	TN1-TN17	Tenth Street Overpass
626-644	BS1-BS19	Broad Street Overpass
645-655	KL1-KL11	Ramp K-L
656-678	RM1-RM23	Ramp M
679-705	ME1-ME27	EB Over Moyamensing
706-733	MW1-MW28	WB Over Moyamensing
734-753	PE1-PE20	EB Over Passyunk Avenue
754-777	PW1-PW24	WB Over Passyunk Avenue
778-784	CSX1-CSX7	CSX Railroad Overpass
785	16U1	Pedestrian Underpass at 16th Street
786	19U1	Pedestrian Underpass at 19th Street
787	RNU1	Pedestrian Underpass at Ramp N
788	SB1	Sound Barrier Repairs
789-793	MS1-MS5	Girder Jacking Details
794	MS6	Concrete Repair Details
795	MS7	Bearing Rehabilitation – Type 1 and 2
796-840	SS1-SS45	Sign Structures
841-881	SG1-SG41	Signal Gantries

Additional drawings of the original construction of the facilities are available at the Authority Engineering office for reference. Complete record sets are not available for distribution.

SP.7. PROGRESS PHOTOGRAPHS

The Contractor shall furnish progress photographs, in digital form, of the Work during this Project in accordance with the following requirements:

1. The Contractor shall take as many color digital photographs as required by the Engineer to show the conditions prior to the beginning of any Work or the moving of equipment onto the site.

2. During construction the Contractor shall take at least thirty (30) color digital photographs per week, showing the progress of the Work.

3. After construction, the Contractor shall take at least fifty (50) color digital photographs at each Work area showing general views similar to those taken prior to construction.

4. The Contractor shall furnish the Authority with digital (.jpg) files on CD-ROM or DVD. All digital photographs must be delivered in **jpg format**. All digital photographs shall be delivered in uncompressed format and have a minimum resolution of 1200 dpi. Each submission shall contain a list of photographs, file names, a description of each photograph and the time each photograph was taken.

SP.8. APPLICABLE STANDARDS, CODES AND REGULATIONS

All equipment and material(s) furnished by the Contractor shall comply with currently applicable sections of the standards, codes and regulations listed below and also those particular requirements specified on the Contract Drawings as well as current federal, state, and local standards, codes, laws and regulations.

Electrical equipment and/or material(s) shall bear the UL label wherever standards have been established by that agency. In lieu of such label, a written certificate from a nationally recognized testing agency, adequately equipped and competent to perform such services may be submitted to the Engineer for approval, stating that items involved have been tested and conform to the requirements specified herein. The methods of testing by the specified agency shall also be included.

Acronyms for organizations and standards cited in the Contract Documents include, but are not limited to, the following:

A. American Association of State Highway and Transportation Officials (AASHTO)

   1. Standard Specifications for Highway Bridges

   2. Manual for Maintenance Inspection of Bridges

B. American Industiral Hygiene Association (AIHA)

1. Proficiency Analytical Testing (PAT) Program for metals analysis

2. Laboratory Accreditation Program for Metals Analysis

C. American Society of Materials Testing (ASTM)

1. ASTM D659, Standard Test Method For Evaluating Degree of Chalking of Exterior Paints

2. ASTM D1400, Standard Test Method for Non-Destructive Measurement of Dry Film Thickness on Non-Conductive Coatings Applied to a Non-Ferrous Metal Base

3. ASTM D3359, Standard Test Methods for Measuring Adhesion by Tape Test.

4. ASTM D4138, Standard Test Method for Measurement of Dry Paint Thickness of protective Coating Systems by Destructive Means

5. ASTM D4285, Standard Test Method for Indicating Oil or Water in Compressed Air

6. ASTM D4414, Standard Practice for Measurement of Wet Film Thickness by Notch Gages.

7. ASTM D4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

8. ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings using Portable Adhesion Testers

D. American Institute of Steel Construction (AISC)

E. American National Standards Institute (ANSI)

F. Code of Federal Regulations (CFR)

1. 29 CFR 1910, Occupational Safety and Health Regulations for General Industry

2. 29 CFR 1910.20, Access to Employee Exposure and Medical Records

3. 29 CFR 1910.132, General Requirements for Personal Protective Equipment

4. 29 CFR 1910.133, Eye and Face Protection

5. 29 CFR 1910.134, Respiratory Protection

6. 29 CFR 1910.146, Permit-Required Confined Spaces

7. 29 CFR 1910.1000, Air Contaminants

8. 29 CFR 1926, Occupational Safety and Health Regulations for the Construction Industry

9. 29 CFR 1926.16, Rules of Construction

10. 29 CFR 1926.20, General Safety and Health Provisions

11. 29 CFR 1926.21, Safety Training and Education

12. 29 CFR 1926.28, Personal Protective Equipment

13. 29 CFR 1926.32, Definition of Competent Person

14. 29 CFR 1926.51, Sanitation

15. 29 CFR 1926.52, Noise Exposure

16. 29 CFR 1926.55, Gases, Vapors, Fumes, Dusts, and Mists

17. 29 CFR 1926.57, Ventilation

18. 29 CFR 1926.59, Hazard Communication

19. 29 CFR 1926.62, Lead

20. 29 CFR 1926.101, Hearing Protection

21. 29 CFR 1926.103, Respiratory Protection

22. 29 CFR 1926.154, Temporary Heating Devices

23. 29 CFR 1926.200, Accident Prevention Signs and Tags

24. 29 CFR 1926.353, Ventilation and Protection in Welding, Cutting and Heating

25. 29 CFR 1926.354, Welding, Cutting and Heating in Way ofPreservative Coatings

26. 29 CFR 1926, Subpart L, Scaffolding

27. 29 CFR 1926, Subpart M, Fall Protection

28. 29 CFR 1926.1118, Inorganic Arsenic

29. 29 CFR 1926.1126, Hexavalent Chromium

30. 29 CFR 1926.1127, Cadmium

31. 29 CFR 1926, Subpart E, Personal Protective and Lifesaving Equipment

32. 40 CFR 50, National Primary and Secondary Ambient Air Quality Standards

33. 40 CFR 58, Ambient Air Quality Surveillance

34. 40 CFR 60, App. A, Method 22, Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Fires

35. 40 CFR 261, Appendix II, Toxicity Characteristic Leaching Procedure

36. 40 CFR 262, Standards Applicable to Generators of Hazardous Waste

37. 40 CFR 263, Standards Applicable to Transporters of Hazardous Waste

38. 40 CFR 264, Standards for Owners and Operators ofHazardous Waste Treatment, Storage, and Disposal Facilities

39. 40 CFR 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

40. 40 CFR 265, Subpart C, Preparedness and Prevention

41. 40 CFR 265, Subpart D, Contingency Plan and Emergency Procedures

42. 40 CFR 265.16, Personnel Training

43. 40 CFR 268, Land Disposal Restrictions

44. 40 CFR 302, Designation, Reportable Quantities and Notification

45. 40 CFR 355, Emergency Planning and Notification

46. 49 CFR 171-179, Hazardous Materials Regulations

G. EPA Methods

1. SW 846, Test Methods for Evaluating Solid Waste- Physical/Chemical Methods

2. Method 1311, Toxicity Characteristic Leaching Procedure (TCLP)

3. 3050, Acid Digestion of Sediment, Sludge, and Soils

H. Manual of Uniform Traffic Control Devices (MUTCD)

I. New Jersey Regulations

1. NJAC, Title 7	New Jersey Pollution Prevention Program Rules
2. NJAC, Title 7	New Jersey Solid and Hazardous Waste Management Act
3. NJAC, Title 7	New Jersey Spill Control Regulations
4. NJAC, Title 7	New Jersey Surface Water Quality Standards
5. NJAC, Title 7	New Jersey Storm Water Management Rules
6. NJAC, Title 13	New Jersey Solid Waste Management Act
7. NJAC, Title 26	New Jersey Air Pollution Control Laws
8. NJAC, Chapter 27	New Jersey Regulations on Toxic Substances
9. NJAC, Title 58	New Jersey Hazardous Discharge Chapter 1 0 B Act Site Remediation
10. NJAC, Title 58	New Jersey Water Pollution Control Act
11. NJAC, Title 5:17	New Jersey Lead Hazard Evaluation and Abatment Code
12. NJAC, Title 8:62	Standards for Lead Certification

13. New Jersey High-Voltage Proximity Act and Regulation

14. New Jersey Department of Environmental Protection – National Heritage Program

J. NIOSH Methods

1. Method 7048, Cadmium

2. Method 7082, Lead

3. Method 7300, Chromium

4. Method 7600, Hexavalent Chromium

5. Method 7900, Arsenic

K. Occupational Safety and Health Administration (OSHA)

L. The Society for Protective Coatings

1. SSPC-SP 1, Solvent Cleaning

2. SSPC-SP 2, Hand Tool Cleaning

3. SSPC-SP 3, Power Tool Cleaning

4. SSPC - SP 10, Near White Blast Cleaning

5. SSPC-SP 11, Power Tool Cleaning to Bare Metal

6. SSPC-SP 12, Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultra-high-Pressure Water Jetting Prior to Recoating

7. SSPC-SP 15, Commercial Grade Power Tool Cleaning

8. SSPC-PA2, Measurement of Dry Film Thickness with Magnetic Gages

9. SSPC-VIS 1, Visual Standard for Abrasive Blast Cleaned Steel

10. SSPC-VIS 3, Visual Standard for Power-and-Hand-Tool Cleaned Steel

11. SSPC-QP1, Standard Procedure for Evaluating Qualifications ofPainting Contractors

12. SSPC-QP2, Painting Contractor Certification Program Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint

13. SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations

14. SSPC-Guide 7, Guide for the Disposal of Lead-Contaminated Surface Preparation Debris

15. SSPC-Guide 16, Guide to Specifying and Selecting Dust Collectors

16. TU7, Conducting Ambient Air, Soil, and Water Sampling During Surface Preparation and Paint Disturbance Activities

17. SSPC-93-02, Industrial Lead Paint Removal Handbook, 2nd Edition, Volume I

18. SSPC-95-06, Project Design, Industrial Lead Paint Removal Handbook, Volume II

Specification References

The Specifications herein presented contain references to specifications and standards established by ASTM AASHTO, trade associations, and other organizations. Such references are made to the edition of the cited specifications, revised to the date of issuance of the Contract Documents for bidding.

In the event that any portion of the above specifications or standards refers to any other specifications or standards, those referenced specifications or standards shall also be considered as part of the Specifications. In the event of conflict between referenced specifications or standards and the Specifications, the Specifications shall govern.

Designs are to be presented in English units. Any details shown or used from other specifications are to be converted to English units. The Contractor is responsible to make the conversion as needed.

SP.9. HOURS OF OPERATIONS

The Contractor shall perform the Work between the normal weekday working hours of 7:00 a.m. to 4:00 p.m. However, other working hours may be directed by the Engineer or required due to operational requirements. Hours for performance of Work shall be as approved by the Engineer, in coordination with the Authority.

Unless authorized in writing by the Engineer, no Work will be permitted on following holidays:

New Year's Day
Martin Luther King Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving
Christmas Day

SP.10. COOPERATION WITH OTHER CONTRACTORS

A. The Authority reserves the right to perform construction or operations related to the Project with the Authority's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site. The Contractor shall coordinate the activities of the Authority's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Authority and/or Engineer in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. Contractor should expect that the Authority's forces and/or contractors will be perrfoming maintenance, snow removal and other activities while the Contractor's performing its Work under this Contract. The Chief Engineer will resolve any disputes or questions regarding the performance of the Work, access to and cleaning up of the site, and priority of performance among the various contractors. The Contractor shall make no claim for damage due to delays caused by necessary operations of the Authority or the Authority's other contractors.

SP.11. NOISE CONTROL

A. The Contractor shall comply with all applicable noise control requirements, whether imposed by federal, state or local law or ordinance, including regulations or orders issued by OSHA, EPA, PADEP, the City of Gloucester, and the City of Philadelphia. In the event of a conflict as to which limit is applicable, the Authority shall have the sole right to make the final determination as to which noise limit shall apply.

B. The Contractor shall monitor noise levels of Work operations to assure compliance with the noise limitations specified in the above referenced standards, laws, regulations, ordinances and guidelines. The Contractor shall retain records of noise measurements for inspection by the Engineer. The Engineer shall be promptly informed by the Contractor of all complaints received from the public regarding noise.

C. Contractor shall provide, at its own expense, all equipment and sound-deadening devices required and employ all noise abatement measures that are necessary to comply with the requirements of this Contract, consisting of, but not limited to:

1. Shields and other physical barriers to restrict the transmission of noise from the Contractor's operations.

2. Sound - proof housing or enclosures for compressors and other pieces of stationary or mobile noise producing equipment, as manufactured by an acoustical products firm approved by the Engineer.

3. Electrically operated hoist and compressor plants, if required, to reduce the level of noise.

4. Silencers on air intakes of equipment.

5. Maximum sized intake and exhaust mufflers on internal combustion engines.

6. Gears on machinery designed to reduce noise to a minimum.

7. Line hoppers and storage bins with sound deadening material.

8. The prohibition of the use of air or gasoline driven saws, unless otherwise permitted by the Engineer.

9. Conducting the operation of dumping rock or other excavated materials and carrying it away in trucks so that noise is kept to a minimum.

10. Routing of construction equipment and vehicles carrying rock, concrete or other materials over the streets that will cause the least disturbance to residents in the vicinity of the Work.

11. Positioning or location of equipment shall be subject to the approval of the Engineer.

D. The Contractor understands that continuous high levels of noise generated by the Contractor's operations may generate numerous community complaints. Should the Authority and/or the Contractor receive said complaints, the Contractor and the Engineer shall meet with the complaining parties in an effort to obtain a mutually agreeable solution. In such instances, the Contractor shall fully implement all measures that are required to lower the objectionable noise level to a reasonable limit and to protect any individual from obtaining permanent physical hearing damage. These measures may include include rescheduling the hours of certain operations, limiting the amount of equipment on site to only that which is essential and the erection of acoustic barriers or enclosures along with other measures previously noted. The Contractor agrees that no noise abatement measure will be considered grounds for additional compensation.

SP.12. REQUIREMENTS OF THE UNITED STATES COAST GUARD (INTENTIONALLY OMITTED)

SP.13. ENDANGERED SPECIES

The United States Fish and Wildlife Service (USFWS), NJDEP and the Pennsylvania Game Commission have indicated that peregrine falcon (Falco peregrinus) nests may be present on the Benjamin Franklin Bridge, Walt Whitman Bridge, Commodore Barry Bridge and Betsy Ross Bridge. Restrictions on bridge work will be imposed between March 1 and July 15 to protect the falcons during their breeding season. A 100-yard minimum distance must be maintained between any work and the nest. All efforts and cautions must be undertaken so as not to harm or disturb nesting falcons on the bridge structure. No consideration will be given to delays or extra cost incurred as a result of nesting falcons.

SP.14. HIGH VOLTAGE AND COMMUNICATIONS CABLES (INTENTIONALLY OMITTED)

SP.15. CABLE PROTECTION (INTENTIONALLY OMITTED)

SP.16. PATCO SAFETY REQUIREMENTS (INTENTIONALLY OMITTED)

SP.17. NJ TRANSIT REQUIREMENTS (INTENTIONALLY OMITTED)

SP.18. PATCO OPERATIONAL REQUIREMENTS (INTENTIONALLY OMITTED)

SP.19. PERFORMANCE OF THE WORK (INTENTIONALLY OMITTED)

SP.20. USE OF STATION FACILITIES (INTENTIONALLY OMITTED)

SP.21. STEEL ESCALATION CLAUSE

The Steel Escalation Clause, as described herein, may be enacted when requested by the Contractor or deemed necessary by the Authority. Enactment of the Steel Escalation Clause will only be considered when the "Adjustment Price" is more than a 5% increase or decrease from the "Benchmark Price" for steel as defined herein.

The use of the price adjustment provisions developed for the Steel Escalation Clause are intended to minimize the cost effects of price uncertainty to the Contractor and the Authority, for most steel used in the construction of this Contract. The price adjustment provisions are not intended to compensate the Contractor for what would be considered normal day-to-day fluctuations or seasonal changes. The price adjustment provisions are not intended to serve as a guarantee for full compensation for steel price fluctuations but are intended to provide for a sharing, by the Authority, in a portion of the Contractor's risk which could result from unusual price fluctuations. The price adjustment provisions do not serve to relieve the Contractor of risks associated with fluctuation in prices beyond the amount adjusted by the provisions.

The Steel Escalation Clause is not activated if the steel price escalation was caused, in whole or in part, by unexcused delay, including, but not limited to, the Contractor's lack of diligence or failure or delay in ordering and taking possession of those steel materials.

If the Steel Escalation Clause is activated, the clause will apply from the period of time the unusual price for steel began, until the end of the contract.

The price adjustment provisions will only apply to:

Structural steel materials permanently incorporated into the Work. Eligible materials include major components of items for which the weight of the steel can be simply determined from manufacturer's / supplier's data or shipping weights, and exclude minor appurtenances individually weighing less than 5 lbs. (i.e., nuts, bolts, washers, etc.).

The Engineer will determine the mass of eligible materials from the following sources, in declining order of precedence:

- Approved Shop Drawings
- Contract Documents
- Industry Standards (i.e., Steel Manual, etc.) and,
- Manufacturer's Data

Price adjustments made under this provision shall be allowed for material price escalation only and shall not include steel fabrication, shipping, storage, handling, or erection and shall not include any overhead or profit or markups for bonds, insurance, or any other contingencies.

Any steel price adjustments payable in accordance with these provisions shall be reduced to reflect any payments received by the Contractor on account of any escalation insurance or similar escalation contingency assurance policy.

Within 5 business days of the bid opening (or within 5 business days of being notified that the bidder is the apparent low bidder if bidder was not the lowest bid received), the bidder shall submit an estimate of the weight of all eligible steel products, broken down by associated Contract pay items. At that time, the bidder shall also submit a detailed breakdown of all costs and assumptions contained in the bid with regard to the eligible steel products which shall constitute the cost basis for the steel. Failure to comply with this requirement or to submit information to the satisfaction of the Engineer with regard to any eligible steel product will preclude the bidder from seeking, requesting, or obtaining any steel price adjustment payments for that particular eligible steel product.

Subsequent to the award of the Contract, the Contractor shall promptly submit to the Engineer copies of all executed purchase orders or sub-contracts pertaining to the procurement of all eligible steel products. Such purchase orders or sub-contracts should clearly identify whether or not the price for the eligible steel product is fixed, or if adjustment is allowed for material cost increases subject to specific provisions. Failure to comply with these requirements will result in denial of steel price adjustment payments.

Steel Price Adjustment Methodology

The steel price adjustment will be based on the price changes for steel as determined below in conjunction with a calculation of allowable steel cost changes determined by examination of associated paid invoices, executed purchase orders or sub-contracts, and previously documented bid costs and assumptions for steel products. In the case of an upward steel price adjustment, the lesser of the two calculated amounts will be paid to the Contractor. In the case of a downward steel price adjustment the amount credited to the Authority will be the actual cost savings as determined from paid invoices.

The monthly index is listed as preliminary for 4 months after initial publication. At contract final acceptance, the Engineer will make final revisions to the adjustment based on revised data. All records, books and documents of the Contractor, which are related or useful to the determinations of steel price adjustments, shall be subject to audit and examination by the Authority and/or Engineer prior to any payments to be made for steel price adjustments.

Determine the percent change in any given month as follows:

$$\%Change = \left(\frac{MI - BI}{BI} \right) \times 100$$

The eligible quantity of each contract pay item will be measured for calculation of the Steel Price Adjustment to the nearest 0.1 Tonnes.

The Benchmark Steel Index (BI) and Monthly Index (MI) are defined as follows:

Benchmark Steel Index. Average of the Producer Price Index (PPI) Semifinished Steel Mill Products (WPU 101702) from USDOL, Bureau of Labor Statistics (BLS), for the month before contract bid letting, month of contract bid letting, and month after contract bid letting.

Monthly Steel Index. Producer Price Index (PPI) for Semifinished Steel Mill Products (WPU 101702) from USDOL, Bureau of Labor Statistics (BLS), in effect at the time the eligible steel product is procured or shipped to the Contractor, subcontractor, or supplier or such other date as determined by the Engineer as appropriate.

Adjustment. Steel price adjustment based upon the monthly indices will be based on the following formulas:

When Price Increases:

$$\text{Pr}iceAdjustment = \left[\left(\frac{MI - BI}{BI} \right) - 0.05 \right] (CB)Q$$

When Price Decreases:

$$\text{Price Adjustment} = \left[\left(\frac{BI - MI}{BI}\right) - 0.05\right](CB)Q$$

Where:

MI = Monthly Steel Index
BI = Benchmark Index
Q = Quantity of steel material, in Tonnes
CB = Cost Basis for the steel, defined in Dollars per Tonnes, as submitted by the Contractor in accordance with this provision.

If steel price adjustments are based on estimated material quantities, and a revision to the total material quantity is made in a subsequent or final estimate, an appropriate addition or deduction will be made to the price adjustment previously calculated. The addition or deduction will be based on the same adjustment factors used to calculate the price adjustment which is being revised.

SP.22. SAFETY CERTIFICATION PLAN (INTENTIONALLY OMITTED)

SP.23. PROJECT LABOR AGREEMENT

The Authority has designated that this Contract will incorporate a Project Labor Agreement ("PLA") into the Contract Documents. The Authority will provide one copy of PLA to all prospective bidders. Schedule A to the PLA comprises the participating Unions' Collective Bargaining Agreements, which must be individually procured from the participating Unions by each bidder. By submitting a bid, the bidder agrees to sign the Letter of Assent, attached as Schedule B to the PLA, and to be bound by the terms and conditions of the PLA, should the bidder be awarded the Contract. In the event of a conflict between the terms and conditions contained in the PLA and those elsewhere in the Contract Documents, the terms and conditions contained in the PLA shall take precedence.

SP.24. FHWA CONTRACT PROVISIONS (INTENTIONALLY OMITTED)

SP.25. QUALITY CONTROL

SP.25.1 QUALITY CONTROL REQUIREMENTS

The Contractor shall develop, implement, and maintain a system adequate to achieve the specified quality of all Work performed, material incorporated, and equipment furnished before use. The system established shall be documented in a written plan developed by the Contractor and approved in writing by the Engineer and the Authority. The system activities shall include the material testing and inspection needed to verify the adequacy of completed work and procedures to be followed when corrective action is required. Daily records to substantiate the conduct of the system shall be maintained by the Contractor. The quality control plan shall cover all aspects of quality control and shall address, at a minimum, all specified testing and inspection requirements. The plan provided shall

be consistent with the planned performance in the Contractor's approved construction schedule. The plan shall identify the Contractor's on-site quality control manager and provide an organizational listing of all quality control personnel and their specific duties. The written plan shall be submitted to the Authority within 15 calendar days after Notice of Award. The Contractor shall not proceed with any construction activity that requires inspection until the written plan is approved by the Authority.

The quality control system shall include, but not be limited to, a rigorous examination of construction material, processes, and operation, including testing of material and examination of manufacturer's certifications as required, to verify that work meets contract requirements and is performed in a competent manner.

SP.25.2 QUALIFICATIONS

Quality control activities shall be accomplished by competent personnel who are separate and apart from on-site supervision and who report directly to management. A competent person is one who is experienced and capable of identifying, evaluating, and documenting that material and processes being used will result in Work that complies with the Contract, and who has authorization to take prompt action to remove, replace, or correct such Work or products not in compliance. Off-site testing laboratories shall be certified or inspected by a nationally recognized entity. The Contractor shall submit to the Authority, for approval, the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.

SP.25.3 DOCUMENTATION

The Contractor's quality control records shall document both acceptable and deficient features of the Work and corrective actions taken. All records shall be on forms approved by the Authority, be legible, and be dated and signed by the competent person creating the record.

The records shall include:

a. Documentation of Shop Drawings including date submitted to and date approved by the Engineer, results of examinations, any need for changes or modifications, manufacturer's recommendations and certifications, if any, and signature of the authorized examiner.

b. Documentation of material delivered including quantity, storage location, and results of quality control examinations and tests.

c. Type, number, date, time, and name of individual performing quality control activities.

d. The material or item inspected and tested, the location and extent of such material or item, and a description of conditions observed and test results obtained during the quality control activity.

e. The determination that the material or item met the Contract provisions and documentation that the Engineer was notified.

f. For deficient Work, the nature of the defects, specifications not met, corrective action taken, and results of quality control activities on the corrected material or item.

SP.25.4 NONCONFORMING WORK REPORTS

The Contractor shall document nonconforming Work discovered by the Contractor, Subcontractors or suppliers.

The Contractor shall prepare "Nonconforming Work Reports" that include:

1. A unique and traceable number;

2. Identification of the nonconforming Work;

3. A description of the nonconformance and the applicable requirement;

4. Cause or reason for the nonconformance;

5. Remedial actions taken or recommended; and

6. Disposition of the nonconforming Work.

SP.25.5 CONTRACTOR'S QUALITY INSPECTIONS

The Contractor shall implement an inspection system. Documentation shall indicate quality control through records of inspections, tests, and procedures.

The Contractor's quality assurance system shall include the following:

a. Single Contractor's representative responsible for on-site communication and operation of the inspection program.

b. Purchasing control system documenting project procurement to drawings, specifications, and approved submittals.

c. Receiving inspection system documenting inspections for each procurement.

d. Documentation for handling and disposing of nonconforming components and materials.

e. Inspection records for each specific section of the Specifications and Drawings.

f. Identification of test(s) to be performed, test procedures, records, and independent organizations used.

g. Documenting and maintaining certification or re-certification of procedures.

h. Management of government-furnished equipment, components, and materials.

i. Calibration of gauges, tools, measuring instruments, and independent laboratories used.

The Contractor shall establish a system of scheduled or random audits to ensure task completion.

SP.25.6 FIELD SERVICES - INSPECTION AND TEST RECORDS

The Contractor shall provide on-site records of each inspection and test performed throughout the term of the Contract. Records shall include, but not be limited to, factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved, identification of operators and inspectors, result of inspections or tests, nature of defects, causes for rejection, proposed remedial action, and corrective actions taken.

Inspection records, test procedures, test results, and associated forms will be verified by the Engineer.

SP.26. CODE COMPLIANCE (INTENTIONALLY OMITTED)

SP.27. WINTER SHUTDOWN

There shall be no winter shutdown or winter Work stoppage. The Contractor shall plan the Work and provide protective measures against adverse weather conditions as required to perform the Work continuously in accordance with the required phasing and within the Contract Time. All protective measures shall be subject to approval by the Engineer. No separate payment will be made in connection with this provision, but all costs thereof shall be deemed to be included in the Contract Sum.

SP.28. FALSEWORK

All falsework shall be designed and checked by a Professional Engineer registered in the ***Commonwealth of Pennsylvania and/or the State of New Jersey*.** Design calculations shall be submitted to the Engineer and approved before falsework is constructed and/or installed. Shop drawings for falsework shall be made and treated the same as shop drawings for new permanent structural components. No allowable overstress will be permitted in falsework. The Contractor's attention is called to Section 1.1.2 of AASHTO regarding "Structural Integrity". In interpreting this section, the decision of the Engineer is final. The cost of falsework and all associated calculations shall be included in the cost of the item for which the falsework is used.

SP.29. DOCUMENT SECURITY PROVISIONS (INTENTIONALLY OMITTED)

SP.30. STAIR TOWER SECURITY (INTENTIONALLY OMITTED)

SP.31. STORAGE AREA

A storage area will be made available to the Contractor in the vicinity of the proposed work, for use as a construction staging and storage area. The location and limits of the property will be designated by the Authority. The Authority does not guarantee the security of these areas and will not assume responsibility for loss or damage of materials or equipment stored within.

Storage areas provided for the Contractor's use shall be returned to their previous condition after the Contractor no longer requires their use. The Engineer will inspect and accept these areas from the Contractor once they have been restored to their original condition.

SP.32. CONSTRUCTION WASTE MANAGEMENT

The Contractor shall comply with the following construction waste management guidelines:

1. Intent & Goal - The Construction Waste Management (CWM) Guidelines are designed by the Delaware River Port Authority (DRPA) and PATCO with the intent to reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

2. Construction Waste Management Practices

    a. Of the inevitable waste that is generated, the waste materials from a project should be salvaged for reuse and/or recycling where practical and possible. Waste disposal in landfills or incinerators should be minimized where practical and possible.

    • Salvageable materials should be diverted from disposal where feasible;

• There should be a designated area on the construction site reserved for materials that can be recycled;

• Areas should be marked to designate what recycle materials are to be stored in these areas;

• Hazardous waste will be managed by a licensed hazardous waste vendor in compliance with all governmental and industry best practices requirements

b. The Contractor is required to comply with all applicable federal, state, and local waste disposal requirements.

3. Construction Waste Management Submittals

a. Please provide a construction waste management narrative for this project; submitted 10 days after the notice to proceed (NTP):

• List potential waste streams designated on site

• List potential locations of waste stream storage on site

• State any potential construction waste management constraints related to the project

• List all construction waste vendors used

b. Please provide monthly invoices and/or waste hauler tickets for all waste removed on site:

• Weight or volume of waste

• Designated waste stream

• Waste facility location

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SECTION T.1 MOBILIZATION AND CLEAN UP

T.1.1 GENERAL

T.1.1.1 DESCRIPTION

A. Mobilization - This Work shall consist of delivery, assembling and setting up for the project, the Contractor's necessary general plant equipment, including offices, shops, plants, storage areas, fencing, materials and equipment, sanitary and any other facilities as required by the specifications, as well as by local and/or State laws and regulations. The determination of the adequacy of the Contractor's facilities, except for those required by government laws and regulations shall be made by the Engineer. The cost of required bonds, insurance, permits, and/or any other initial expense required for the start of the Work shall be included in this item.

B. Demobilization - This Work shall consist of removing from the site after completion of the Work all general plant and equipment described in (A) above. In addition, all storage areas and working areas shall be cleaned of all rubbish and discarded materials, and left in a condition satisfactory to the Engineer. Any damage to the property of the DRPA and any other property owner within the project limits by the Contractor's operations shall be repaired to the satisfaction of the Engineer at the Contractor's expense. In addition, the Contractor shall be responsible for all costs and additional liabilities incurred as a result of such damage, including but not limited to payment of attorneys fees, and shall indemnify the Authority as set forth in Section E.39, as appropriate. The project will not be considered complete until the above Work has been completed.

T.1.2 MATERIALS

The Contractor shall furnish all materials and furnishings required for this item. These materials and furnishings will not be considered as a part of the other completed contract items.

T.1.3 METHOD OF CONSTRUCTION

The Contractor shall provide all tools, equipment, materials, labor, and Work for the construction and furnishing of the required facilities and services. All Work shall be performed in a safe and workmanlike manner.

END OF SECTION

SECTION T.2 ENGINEER'S FIELD OFFICE

T.2.1 GENERAL

T.2.1.1 DESCRIPTION

This Work shall consist of providing furniture and equipment for and maintaining the Engineer's Field Office as specified herein.

The Contractor shall provide and maintain a field office in close proximity to the construction site for the exclusive use of the Engineer. The field office shall be a purposed trailer-type field office with a minimum nominal size of 12 ft. wide by 56 ft. long with satisfactory heating and cooling; equipment capable of heating the office to at least 70F and cooling to at least 78F. The exact location of the office and floor plan shall be submitted to the Engineer for approval. Requirements for the Engineer's office are as specified further in this Specification.

T.2.2 MATERIALS AND EQUIPMENT

Provide the following:

Engineer's Field Office Requirements:

A. Provide a plan table, approximately 12 feet in length, along one wall. The space under the plans table shall be divided into compartments for storage of rolled prints.

B. Facilities:

1. One approved electric water cooler providing both hot and cold water from bottled water, and with a built-in refrigeration compartment.

2. One plan rack suitable for holding a quantity of 250 E size drawings and a minimum of 6 plan sticks each.

3. Provide a fully stocked first-aid kit with contents meeting current ANSI/ISEA Z308.1 minimum standards.

C. Office Equipment and Furnishings:

1. In addition to the above, the following equipment shall be furnished, placed, and maintained:

a. Four (4) – 30 inch by 60 inch Shaw-Walker, or approved equal, metal desks with seven drawers.

b. Two (2) fire resistant four-drawer legal size file cabinets with locks meeting UL standards for not less than one-hour test.

c. Two (2) – four-drawer letter size file cabinets with locks.

d. Four (4) Shaw-Walker, or approved equal, desk swivel chairs.

e. Clothes trees (1).

f. Five (5) fluorescent 30 watt desk lamps with adjustable arm and a base for placing on desk.

g. One pressurized dry powder fire extinguisher with minimum capacity of ten pounds.

h. Three telephone instruments, two line hold, conference and intercom features. Provide additional separate telephone lines to each computer and fax machine.

i. One electrostatic dry process copying machine capable to reproducing and color scanning 8-1/2 inches by 11 inches and 11 inches by 17 inches size paper: The Contractor shall pay the monthly rental and/or service charge.

j. One electrostatic dry process copying machine capable of reproducing engineering drawings up to 24 by 36 inches, as manufactured by Xerox, or an approved equal. Contractor shall pay the monthly rental and/or service charge.

k. Four (4) trash containers.

l. Two electric wall clocks.

m. FAX machine, plain paper: Pitney Bowes 9820, or approved equal.

2. The Contractor shall provide the following computer equipment exclusively for the Engineer's use during the Project.

a. Four (4) Dell Inspiron 660 computers with 2nd Generation Intel Core i3-2120 processor (3M Cache, 3.30 GHz) or better Computers or approved equivalent including 6GB Dual Channel DDR3 SDRAM at 1,600 MHz, minimum of 1 TB byte internal hard drive (7200RPM with DataBurst Cache), tower case with a minimum of 2 free expansion slots, LAN Card, 16X DVD/RW Optical, Intel Integrated HD Graphics Media 2000 video card.

The operating system shall be Windows 7. The packages shall also include a mouse and key board.

b. Four (4) – Dell IN1930 18.5 inch Widescreen Flat Panel LED Monitors or approved equal.

c. One Dell 7130cdn Laser printer with 11-inch by 17-inch paper option or approved equal.

d. Each computer shall be provided with the following software: Microsoft Office Professional 2010 including Outlook 2010, PowerPoint 2010, Excel 2010 and Word 2010. Each computer should also be provided with AutoCad Civil 3D Land Desktop 2008, and Primavera Project Planner scheduling software, latest edition.

e. All required interface and LAN cables and adaptors to network the equipment. In addition computers and copiers are to be linked to allow scanning of documents.

f. Full-service high speed internet connection for each computer with technical support for the duration of the Contract.

g. The entire system shall include a single comprehensive on-site warranty, paid by Contractor, for the duration of the Contract.

D. Digital Cameras: Provide two (2) digital cameras with the following minimum specifications: 10 megapixels, 5X optical zoom, 3.0" LCD monitor. Each camera to have case, back-up battery, 8GB SanDisk memory stick or approved equal.

E. Telephone Service: Telephone service shall be provided by the Contractor. The monthly service charge and all toll charges shall be paid by the Contractor during the length of the Contract and during any and all extensions of Project Time. Two single party lines with an additional line for the FAX shall be furnished.

T.2.3 METHOD OF CONSTRUCTION

T.2.3.1 GENERAL

A. Install the indicated items no later than 5 working days after the Notice to Proceed date or 5 days prior to the scheduled start of Work. Maintain the facilities from installation until 30 days after physical Work has been satisfactorily completed, unless released earlier by the Engineer. The Engineer may direct that the facilities be maintained for more than 30 days after physical Work has been satisfactorily completed, as necessary, to allow time for the

Authority Personnel to process outstanding project records. Remove and dispose of facilities, materials, and furnishings upon release by the Engineer.

T.2.3.2 MAINTENANCE AND SERVICE

A. Provide daily maintenance of the field office during the construction period including, but not limited to, cleaning, repair of unit, continuously supplying water cooler and bottled water, and complete janitorial services and supplies such as toilet paper, paper towels, and soap; and also provide snow removal.

B. Provide continuous maintenance of utility tie-ins during the construction period.

T.2.3.3 REMOVAL

Upon project completion, the Contractor shall assume ownership of and remove the furniture, equipment, and materials supplied and specified herein from the job site. All items and structures originally located on the job site shall not be removed.

END OF SECTION

SECTION T.3 FIELD SURVEY AND ENGINEERING

T.3.1 GENERAL

T.3.1.1 DESCRIPTION: This work shall consist of providing field engineering services as needed to properly locate and measure elements of the roadways and structures, and to confirm the information contained on the existing contract drawings and/or the existing shop drawings. The work included in this item includes establishing alignments, profiles, elevations, distances, and other geometric relationships among various project components and/or external references as necessary in order to successfully complete the work specified under the other item numbers of this document. The cost of any necessary revisions to shop drawings, due to the plan dimensions deviating from the actual dimensions as revealed by the Field Survey, shall be included in this item.

In addition, this Item shall include a full time quality control person designated to provide quality control for the duration of the project. The Contractor is to submit experience and certifications of quality control personnel for approval by the AUTHORITY. The person is to perform quality control in accordance with the technical specifications and those specified in Special Provision SP.25.

T.3.1.2 QUALITY ASSURANCE

All field surveying shall be completed by a professional Land Surveyor registered in the Commonwealth of Pennsylvania and in the State of New Jersey.

T.3.1.3 SUBMITTALS

(1) The Contractor shall submit to the Engineer sketches showing the actual dimensions and distances measured in the field. Include any temperature corrections from the temperatures at which the measurements were made.

(2) The Contractor shall submit to the Engineer all geometric calculations made to obtain detail dimensions.

(3) The Contractor shall submit to the Engineer the necessary revisions to the shop drawings whenever the indicated dimensions deviate from the actual dimensions as revealed by the Field Survey.

(4) The Contractor is to submit experience and certifications of quality control personnel for approval by the AUTHORITY.

T.3.2 MATERIALS

Standard materials normal to the trade.

T.3.3 METHOD OF CONSTRUCTION

T.3.3.1 LAYOUT WORK

(1) The Contractor shall protect and preserve any established reference points and shall make no changes in their locations without the approval of the Engineer and the Authority. Reference points lost, disturbed by construction, or destroyed shall, subject to prior approval of the Authority and the Engineer, be replaced or relocated and the new location shall be accurately recorded. The foregoing shall be completed at no additional cost to the Authority.

(2) The Contractor shall furnish all equipment and qualified personnel necessary to preserve the accuracy of the reference points and the Contractor shall use theses points to layout the lines and grades necessary for the complete construction of the project.

(3) The Contractor shall be responsible for maintaining the points he has established. Any error or apparent discrepancies found shall be called to the Engineer's attention in writing for interpretation prior to proceeding with the work.

(4) The Contractor shall be responsible for ensuring that the finished work conforms to the lines and grades called for on the Contract Drawings, and shall correct all errors caused by his personnel at no cost to the Authority.

T.3.3.2 PRESERVATION OF FIELD BOOKS

The contractor shall preserve field books and stakeout data until final acceptance of the work at which time the materials shall be submitted to the Engineer. Field books and stakeout data shall be made available to the Engineer upon request during the course of construction.

END OF SECTION

SECTION T.4 COORDINATION OF ELECTRICAL UTILITIES

T.4.1 GENERAL

T.4.1.1 DESCRIPTION

A. This work is the locating, protection, and relocation of existing electrical utilities, including Authority owned facilities, in the vicinity of the project site. This work also includes the coordination with the owner's of any utility located within the project area.

T.4.1.2 QUALITY ASSURANCE

A. The Contractor shall adhere to the requirements of the National Electric Safety Code, the Occupational Safety and Health Administration's Regulations, and as deemed necessary by the utility company with the Engineer's concurrence.

B. Design of Temporary Supports
   (1) The Contractor shall be responsible for the design of temporary supports for existing utilities encountered during the execution of the work. The design of temporary supports shall be performed by a Professional Engineer registered in the Commonwealth of Pennsylvania.
   (2) Temporary supports shall be designed for 150% of the calculated dead load of the utility to be supported and as a minimum the loading shall not be less than 1500 lbs/ft.
   (3) The design of temporary supports shall be in accordance with the applicable sections of the AASHTO - "Standard Specifications for Highway Bridges" 16TH Edition, 1996 and accepted standards of construction.

T.4.1.3 SUBMITTALS

A. In accordance with SP.14, the Contractor shall submit the following to the Engineer for review and approval:
   (1) The Contractor shall submit shop drawings indicating its plan and schedule for performance of work to Philadelphia Electrical Company (PECO) for review and approval. A copy of this submittal shall also be furnished to the Engineer by the Contractor.
   (2) The Contractor shop drawings shall detail actual location of existing facilities, interference which these facilities present to new work, proposed method of proceeding with actual construction and details of proposed support systems.
   (3) Do not commence work until written approval has been received from the affected utilities and the Engineer.

T.4.2 MATERIALS AND EQUIPMENT

T.4.2.1 GENERAL

A. Materials used for the relocation or reconstruction of existing PECO facilities shall be in

conformance with PECO requirements.

T.4.2.2 TEMPORARY SUPPORTS

A. The selection of materials to be used for the construction of temporary supports shall be the responsibility of the Contractor and subject to the review and approval by the Engineer and the utility owner. All materials used shall be in good condition and, as a minimum, shall meet the following standards:

(1) Steel - All structural steel members and plates shall conform to AASHTO M 270, Grade 36 (ASTM A709, Grade 36)
(2) Fasteners - AASHTO M 164 (ASTM A325)
(3) Welding - AWS D1.1 and D1.5
(4) Timber - AASHTO M 168

T.4.3 METHOD OF CONSTRUCTION

T.4.3.1 GENERAL

A. All correspondence between the Contractor and PECO shall be directed to:

PECO ENERGY Co.
830 S. Schuylkill Ave.
Philadelphia, PA 19146
Attn: Mr. Richard Rock

B. Ascertain and locate any utility lines, including Authority owned facilities, in the vicinity of the entire project and take all precautions to fully protect the utility and service. Prior to performing any work in the vicinity of any underground or overhead line or service, advise PECO at least 72 hours in advance of initiating work and provide all measures for protection in accordance with the National Electric Safety Code, the Occupational Safety and Health Administration's Regulations, and as deemed necessary by PECO with the Engineer's concurrence. The Contractor shall coordinate the protection and/or relocation of existing utilities.

C. Contact all utility company representatives at least 15 working days prior to starting construction, and all affected utilities at least three weeks in advance of any required facility movements in order to schedule and coordinate operations.

D. Interruptions of service are fully under the control of PECO. Except for emergencies, schedule and have approved in writing, any shut down of utilities by PECO. Time all construction work so as not to conflict with or burden the operation of PECO.

E. Portions of the construction are in the immediate proximity of existing PECO utilities that will remain in place. Submit a method and schedule of construction for approval to insure the safety of the existing structures. The Contractor shall be responsible for any damage caused to existing facilities. The Contractor shall satisfactorily repair such damage, to the

satisfaction of the Engineer without additional compensation.

T.4.3.2 WORK BY PECO ENERGY CO.

A. PECO Energy Co. shall perform all work necessary and as indicated on the Contract Drawings. PECO Energy Co. shall also perform any necessary temporary relocations.

B. The Contractor shall be responsible for coordinating this work with PECO Energy Co. through the contact person provided.

END OF SECTION

SECTION T.5 CLEARING AND GRUBBING

T.5.1 GENERAL

T.5.1.1 DESCRIPTION

This work is:

A. Removal of topsoil and organic matter within the limits of grading.

B. Removal of objectionable material, rubbish, and junk within the project limits.

C. Removal of fences, guide rail posts, guide rails, signs, direction markers, and other obstructions interfering with the work.

D. Disposal of removed material in suitable waste areas off-site. Obtain all necessary permits.

E. Salvage of material including topsoil, if required, including temporary storage and delivery.

F. Replacement of required suitable material wasted in clearing and grubbing.

T.5.2 MATERIALS

None

T.5.3 METHOD OF CONSTRUCTION:

A. Complete clearing and grubbing before starting grading operations in an area. However, stumps within excavation areas may be removed during grading.

B. Do not damage trees or other vegetation beyond the grading limits.

C. Within excavation areas, clear the ground of organic matter. Remove stumps and roots to a depth of at least 2 feet below subgrade or slope surfaces.

D. Within embankment areas 5 feet or more in depth, cut trees and stumps to within 6 inches of the ground surface. Where these embankment areas will be one-foot or less in depth, cut trees or stumps flush with the ground surface.

E. Within embankment areas less than 5 feet in depth, remove organic matter and topsoil to a depth of 8 inches below the existing ground to 20 feet beyond the pavement edges. Beyond 20 feet of the pavement edges and within the

embankment area, cut trees and stumps flush with the ground surface. Remove the remaining topsoil over 8 inches in depth, when directed.

F. Dispose of material off the right-of-way, unless otherwise specified.

END OF SECTION

SECTION T.6 MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION

T.6.1 GENERAL

T.6.1.1 DESCRIPTION

This work consists of furnishing, installing, maintaining, moving and relocating traffic control devices, furnishing flagmen, controlling, warning, guiding, and protecting vehicular and pedestrian traffic affected by construction of the project; restricting construction vehicular and pedestrian traffic to approved routes; prohibiting stopping and parking of vehicles adjacent to the worksite. This item includes removal of temporary traffic control devices and removing/covering and reinstalling/uncovering the permanent signing. This work also includes removal of striping, furnishing and installing temporary striping and providing the necessary traffic controls needed to set up the traffic control shown on the Contract Drawings.

Prior to submitting bid, contact the PennDOT, as specified in the General and Special Provisions, to determine their traffic requirements. Any costs which are not included in the bid, resulting from failure to do so, will not be considered for payment.

No weekend work is permitted on holiday weekends or two hours in advance or after events held at the sports complex.

Off-Peak refers to the hours of 9:30 AM to 2:30 PM. Perform tasks associated with this stage of construction on weekends only after receiving approval from the Engineer to do so one week in advance.

The Contractor is responsible for obtaining the required permits for working in local and state routes from the governing agencies.

T.6.1.2 RELATED SECTIONS

A. Section T.7 – Tow Trucks
B. Section T.8 – Temporary Inlet Grate

T.6.1.3 SUBMITTALS

A. Provide product data to the Engineer for approval for the temporary traffic control devices specified herein.

B. Provide certification for traffic control devices specified herein.

T.6.1.4 QUALITY ASSURANCE

Conform to the following:

A. PennDOT Standard Publication 408/2016-5
Section 901 Maintenance and Protection of Traffic During Construction

B. 67 Pennsylvania Code
Chapter 212 - Official Traffic-Control Devices (PennDOT Publication 212/3-06)

C. "Manual on Uniform Traffic Control Devices" for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration

D. "Standard Highway Sign Publication", Federal Highway Administration

E. PennDOT Publication 213/June 2014 - Temporary Traffic Control Guidelines

T.6.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 901.

T.6.2 MATERIALS

T.6.2.1 TRAFFIC CONTROL DEVICES

Traffic control devices need not be new, but should be in good condition, as approved by the Engineer.

A. Construction Signs

All existing aluminum sign panels and supports to be replaced as part of this contract are the Authority's property. Remove and store at a location indicated by the Authority.

Installation, dimensions, colors and details of signs should follow the standards in the current "Standard Highway Sign Publication" and the current "Manual on Uniform Traffic Control Devices" for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration.

Furnish and place THIS ROADWAY TO BE UNDER CONSTRUCTION signs as indicated on the Contract Drawings at the limits of work of the project four work days before the start of construction, as directed. Remove signs at the start of the project construction.

Place W20-1 signs located at the beginning of the project, and W21-20 signs not more than 500 feet beyond the limits of the project as the first order of work for construction signs.

Backing Material (Alternatives)

Aluminum should be flat sheet of 6061-T6 Alloy, 0.125 inches thick. Plywood should be 5/8" minimum thickness, exterior type, high or medium density overlaid on both sides, manufactured in accordance with "Commercial Standard CS 45-60 for Douglas Fir Plywood" of the U.S. Department of Commerce.

Sign Faces

Reflective sheeting for the signs should be orange "Scotchlite" No. 2884 as manufactured by Minnesota Mining and Manufacturing Company or equal.

Supports

Sign supports should be well seasoned lumber, S4S, free of splits, knots and warp, or steel components subject to the approval of the Engineer.

Fastening

Securely fasten all signs to their supports with bolts, nuts and washers of aluminum (2024-T4 Alloy) or of galvanized carbon steel.

B. Drums

Drums should be 36 inch high ballasted, plastic, roll-proof barrels equipped with alternate orange and white stripes of pressure sensitive utility grade reflective sheeting, as manufactured by Royal Industries Sign Division or an approved equal.

C. Low Intensity Flashing Warning Lights

Low intensity flashing lights should have one and two lens-directional faces. The color of the light emitted should be yellow. They should have a minimum intensity of 4 candelas. They should flash at a rate of 55-75 flashes per minute and the flash duration should be 10 percent of each flash cycle.

D. High Intensity Flashing Warning Lights

High intensity flashing warning lights should have a one lens directional face. The color of the light emitted should be yellow. They should have a minimum effective intensity of 35 candelas. The lights should flash at a rate of 55-75 flashes per minute and the flash duration should be 8 percent of each flash cycle.

E. Traffic Cones

The Traffic Cones used for channelization should be twenty-eight (28) inches minimum in height. Traffic cones should meet the requirements as specified in the "Manual of Uniform Traffic Control Devices".

F. Traffic Directors

The Engineer may require the Contractor to station traffic directors (also referred to as flaggers) at certain locations, where in the judgment of the Engineer, conditions dictate that steps be taken to regulate and protect traffic. Traffic directors should be trained flaggers, in good physical condition including sight and hearing, mentally alert, and should have a courteous but firm manner, neat appearance and a sense of responsibility for the safety of the public. Traffic directors should wear an orange or fluorescent-orange garment such as a shirt, jacket or vest. This garment should be reflectorized for nighttime operations with orange reflective material. When controlling traffic, traffic directors should be equipped with STOP/SLOW paddles and should follow the procedures stipulated for flaggers in the "Manual on Uniform Traffic Control Devices".

G. Shadow Vehicle/Truck-Mounted Attenuator

The truck should be a 10-ton vehicle adaptable to mounting an impact attenuator on the rear and a 4' x 8' foot illuminated flashing arrow on the bed of the truck. The truck should be approved by the Engineer prior to use.

The mounting of the impact attenuator on the rear of the truck and the 4' x 8' illuminated flashing arrow on the bed of the truck should be in accordance with the attenuator manufacturer's recommendations.

Use the truck in all cases to set up maintenance and protection of traffic patterns, escort the Contractor's truck(s), pattern changes, material deliveries, barrier moves, take down of patterns and as directed by the Engineer. The shadow vehicle should have warning lights and a 360^{o} revolving amber light.

The Truck-Mounted Attenuator (TMA) should be the hex foam truck-mounted attenuator manufactured by Energy Absorption System, Inc. or approved equal.

The attenuator should have a minimum of 72 square inches of high intensity reflective sheeting toward the extremities on each side of the equipment. A minimum of 144 square inches of the sheeting should be visible from each direction.

Attach the TMA to the traffic control truck in accordance with the attenuator manufacturer's specifications and recommendations.

Repair or replace units or parts of the TMA which are damaged or become inoperable during construction. Have available a complete replacement module and the required components for full restoration at all times on the project without additional compensation.

Place the TMA in advance of each and every work zone. TMA’s are

required to protect each work crew located within a short term lane closure. Protect work crews separated by a distance of 100 feet or greater by a TMA.

Use the TMA as shown on the Contract Drawings on the entrance/exit opening to protect work areas.

H. Nighttime Lighting

Prior to the start of nighttime operations, submit a temporary construction lighting plan for review and approval. The lighting plan should specify the construction area to be lighted, the layout of the lighting units, and the illumination intensity of the lighting system with calculation to show minimum footcandles. The construction area is defined as the area in which any and all work related to the construction is on-going and is to be performed during the hours of darkness. Do not begin any nighttime construction until the lighting plan is approved in writing by the Engineer.

Illuminate nighttime operations with a lighting system consisting of mobile units of floodlights capable of providing the construction area with a minimum illumination intensity of 20 footcandles. Each floodlight unit should provide a minimum of 10 footcandles. Position the lighting units such that they do not cause glare to drivers or any nearby homes. Floodlight lamps for the lighting system should be mercury vapor.

Furnish shop drawings of the lighting units in accordance with the special provision for shop drawing submittals. Provide and have available a footcandle light meter for use by the Engineer during night time operations.

Power the lighting system with a generator. Each generator should have a fuel tank of sufficient capacity to permit operation of the lighting system for a minimum of 12 continuous hours.

All equipment used for nighttime operations should have a minimum of 72 square inches of high intensity reflective sheeting toward the extremities of each side of the equipment. A minimum of 144 square inches of the sheeting should be visible from each direction. All workers should, during the hours of darkness, wear reflectorized garments as specified for traffic directors.

I. Waterborne Pavement Markings - Per PennDOT Publication 408/2016-5, Section 962.2

J. Arrow Panels

a. At a minimum, each arrow panel shall be capable of displaying each of the following messages modes:

(1) Left flashing arrow or left sequential chevron.

(2) Right flashing arrow or right sequential chevron.

(3) Simultaneous left and right flashing arrows.

(4) A caution mode, consisting of four lamps arranged in a rectangular pattern that will not indicate a direction.

b. Provide self-contained arrow panels with the following capabilities in addition to those listed above:

(1) Trailer-mounted

(2) Solar powered or battery-operated

(3) 4' x 8' black panel with yellow flashing arrow dots

(4) Two lights on back of panels to indicate the direction and operation of the arrow panel

c. Arrow panels shall have an automatic dimming circuit that is actuated by a photocell at a light level of approximately 5 footcandles to provide a minimum of 50% dimming from the rated lamp voltage.

K. Temporary Impact Attenuating Devices - Per PennDOT Publication 408/2016-5, Section 696.2.

L. Temporary Barrier – Per PennDOT Publication 408/2016-5, Section 627.2.

M. COMPLETE ROADWAY CLOSURE

A complete closure of the roadway is required to remove and reinstall existing overhead sign structures and cantilever structures extending beyond the limits of staged construction. Each complete roadway closure shall be limited to a 4 hour period, after which the roadway will be opened to clear any accumulated traffic. No closure shall be permitted on weekends and holidays. No complete closures shall be permitted except as noted below:

1. For removal of existing sign structures S-1, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-18, S-19, S-20 and S-21.

2. For installation of new sign structures S-1, S-3, S-4, S-5, S-6, S-8, S-9, S-10, S-11, S-13, S-14, S-15, S-16, S-17EB, S-17WB, S-18, S-19, S-20 and S-21.

The Contractor shall coordinate with PennDOT and the Authority to ensure that the following message is placed on all permanent changeable message signs on

all routes directly leading to these locations for at least one week in advance of any proposed roadway closure:

I-76 (EB/WB)
TO BE CLOSED
XX/XX 12 AM-4 AM

Identify Eastbound (EB) or Westbound (WB).

The date XX/XX is to be expressed in mm/dd format. This message is to be phased as necessary with any other messages required during that time period in accordance with MUTCD.

No roadway closure will be allowed if the Contractor has not first submitted and gained Authority and Engineer approval on the details and plans for the complete roadway closure, or if the above message has been displayed for less than one week.

N. LANE CLOSURE LIMITATIONS

(a) Short-term Closures (Queueing Ramp U/Passyunk Ave):

1. The Contractor shall request police assistance in setting up closure through the Engineer.

2. The Engineer will advise the DRPA Police no fewer than (7) days in advance of the anticipated closure.

3. The DRPA Police will escort the Contractor's vehicles into closure area, and will temporarily divert traffic during set up.

Short-term closures are permitted as generally described herein. Every Thursday by noon, the Contractor shall submit his plan for short-term closures for the following week starting Monday. Lane closings will not be permitted if the Contractor fails to notify the Engineer of his lane closing needs by this specified time. In the event of emergency or unusual traffic conditions, permission will not be granted for short-term closures. A week will be considered as starting at 5:00 a.m. each Monday.

T.6.3 METHOD OF CONSTRUCTION

A. Prior to beginning construction, place traffic control devices where shown on the Contract Drawings or as directed by the Engineer. Keep devices clean and maintain in good condition. When no longer required for the project, remove and dispose the traffic control devices.

B. Remove existing pavement markings, as indicated, immediately before any change in traffic patterns or before the application of final markings. Remove markings that conflict with revised traffic patterns and may confuse motorists. Do not paint over existing lines with black paint.

Remove markings for restriping to the extent that 90% of the material is removed without materially damaging or grooving the pavement surface more than 1/32 inch. For all other marking removal, eliminate the markings to the extent that the marking is not visible to motorists when viewed from a distance of 50 feet. Remove waterborne pavement markings by sandblasting, grit blasting, steel shot blasting, or waterblasting. Grinding is acceptable only for the removal of thermoplastic, cold plastic, or epoxy marking materials. Obtain approval from the Representative for the proposed removal method before beginning work.

Vacuum or collect residue, including sand, dust, and marking material, concurrently with the removal operation unless alternate procedure is submitted and accepted. Clean the area of dust with compressed air. Perform this work only in the area where the markings are to be applied. Do not allow sand, dust, or other residual material, which may interfere with drainage or constitute a traffic hazard, to accumulate. Dispose of all residue in an acceptable manner.

Repair any pavement or surface damage caused during the removal process. Prevent damage to transverse and longitudinal joint sealers, and repair any damage.

C. Temporary Pavement Markings – Per PennDOT Publication 408/2016-5, Section 962.3

D. Arrow Panels
   a. Place the arrow panel units at indicated locations.
   b. Relocate arrow panels, as required to fit the traffic patterns. Remove the arrow panels when no longer needed.
   c. Provide all fuel and complete maintenance for the duration of the project for each self-contained arrow panel.
   d. Provide one self-contained arrow panel unit as a stand-by. Be prepared to place the stand-by arrow panel within one hour of notification of the inoperability of an arrow panel unit.
   e. The stand-by arrow panel is incidental.

E. Temporary Impact Attenuating Devices - Per PennDOT Publication 408/2016-5, Section 696.3 and 697.3.

F. Repair of Temporary Impact Attenuating Devices will be paid for as Force Account Work.

G. Temporary Barrier – Per PennDOT Publication 408/2016-5, Section 627.3

H. Lifting of Construction Materials

a. Stop traffic during the placement or removal of any construction materials that are above open lanes of traffic, such as, but not limited to, lifting equipment, bridge components, signs, and overhead sign structure components as directed.

T.6.3.1 TRAFFIC CONTROL COORDINATOR

A. Prior to the start of construction operations, assign a supervisory-level employee to be the Traffic Control Coordinator. Notify the Engineer as to the name and method of contacting the Traffic Control Coordinator on a 24-hour basis.

B. The Traffic Control Coordinator should perform daily inspections, including weekends and holidays, with some inspections at night, and take all corrective action to ensure compliance with the Traffic Control Plan (TCP) and other approved standards. Advise the Engineer of the schedule of these inspections and give the Engineer the opportunity to join in the inspection. In addition, the duties of the Traffic Control Coordinator should include, but will not be limited to, the responsibility for ensuring the following:

- Set-up and removal of all traffic control devices in accordance with the Contract Documents.
- Correction of deficiencies of traffic control devices. Correct or replace damaged devices within one hour from notification of the Engineer.
- Repositioning traffic control devices displaced by traffic or construction equipment.
- Covering or uncovering signs as appropriate.
- Repairing and/or replacing damaged traffic control devices. Correct or replace damaged devices within one hour from notification of the Engineer.
- Replacing batteries, light bulbs, control panels and other electrical components.
- Keeping all traffic control devices clean.
- Adding fuel and oil to power units for traffic control devices.
- That all Contractor's equipment and vehicles are properly stored and parked so as not to create a traffic hazard.
- Properly storing traffic control devices when not in use.
- That all excavations or drop-offs greater than 2 inches deep are eliminated or otherwise protected during non-working periods.

T.6.3.2 STAGE CONSTRUCTION

The safe and efficient movement of traffic during all of the proposed construction stages is the primary goal of the maintenance and protection of traffic scheme that is shown on the Contract Drawings and as described herein.

Five stages of construction will be used for the roadway rehabilitation and resurfacing of the bridges on the project. Two lanes of traffic will be maintained in the westbound direction during

peak periods at all times except where shown during stages 1 and 2.

A. TRAFFIC CONTROL PLANS (TCP)

TCP's contained in the Contract Drawings are part of the contract. Adhere to the TCP's except for lane closings which the Contractor needs or wants that are specific to his operation. In those cases, prepare and submit a TCP sealed by a Professional Engineer (PE) registered in the Commonwealth of Pennsylvania to the Engineer for review and approval. Prepare TCP in accordance with PennDOT Publication 213, MUTCD and the Authority's requirements. The Authority's requirements for the maintenance and protection of traffic are as follows:

·Truck Mounted Attenuators (TMA) are required to protect each work crew located within a short term lane closure. Protect work crews separated by a distance of 100 feet or greater with an additional TMA;

·Place flashing arrow panels at the beginning of the closure and prior to the work zone.

·All advanced signing should be in accordance with PennDOT specifications and the MUTCD.

Submit to the Engineer complete details of the methods to be used for the safe restriction to the movement of traffic required for operations, prior to the intended starting time of operations affecting traffic. Methods not approved will be returned for revision and should be resubmitted for further review. The Contractor's methods submitted for approval should include complete information, data and/or sketches covering the means proposed by the Contractor for the protection of the public and his own personnel and equipment, including layouts and schedules showing the anticipated lane closing, truck access points, locations of all devices for lane closing and protection of traffic, and anticipated dates and rates of progress of work. It is the Contractor's responsibility to use the appropriate work zone traffic control case or cases as outlined in PennDOT Publication 213 to set up the maintenance and protection of traffic pattern that is shown on the Contract Drawings. Submit to the Engineer for approval prior to commencement of work, the intended work zone traffic control case that is associated with the required traffic control pattern called for on the Contract Drawings.

If the approved methods of operations submitted by the Contractor are not strictly adhered to by the Contractor, the Authority has the right to order all work which, in the opinion of the Authority, affects the maintenance and protection of traffic, to be immediately discontinued. Such work should not be resumed until the Authority is assured and satisfied that the Contractor will perform the work in conformity with the approved methods of operations. The Contractor shall have no claim against the Authority for the losses or delays caused by such work stoppage. The Authority reserves the right to alter approved Traffic Control Plans (TCP) to better accommodate traffic.

The Authority's approval of Traffic Control Plans (TCP) and/or its failure to approve such plans in no way shifts responsibility for traffic safety from Contractor to the Authority, and the Contractor remains liable to indemnify and hold the Authority harmless from and against any loss, cost, or expense relating to such Traffic Control Plans (TCP).

Be responsible for transporting all personnel to and from enclosed or closed-off areas. Personal vehicles will not be permitted to be parked anywhere within Authority or private properties, except in areas designated by the Authority.

B. CONSTRUCTION STAGING

See Traffic Control Plans for detailed Sequence of Construction.

Maintain all traffic control signs, channelizing devices, arrow panels, and shadow vehicles as shown on the Contract Drawings.

No open excavation or blunt ends of barrier are to be left in the median once the off-peak lane closures have been opened to traffic. Protect all blunt ends with an approved impact attenuating device or tie the temporary barrier to the existing barrier at the end of each work day.

Remove all traffic control devices from the roadway and roadside at the end of each work day.

C. CONTRACTOR'S VEHICLES IN WORK AREAS

Whenever the Contractor's vehicles operate in lanes open to traffic, always travel with and not across or against traffic.

Vehicles should enter and leave work areas in a manner which will not be hazardous to or interfere with traffic. During lane closings when a flagman is not on duty, vehicles operated solely for the transportation of supervisory personnel, flagmen, or approved inspectors will be allowed access to the work site. Vehicles so employed will be required to be equipped with a yellow flashing signal, visible throughout 360 degrees. Do not park or stop vehicles in roadways, except within the closed lane(s). The Contractor's vehicles will not be permitted to make U-turns across the roadway or in the Toll Plaza area. Any driver making any illegal turn will be subject to a summons by the Police and the vehicle will be subject to removal from the project site.

Points for leaving and re-entering the traffic flow should be, in general, at the beginning and end of a lane closing. Provide uniformed flagmen as directed by the Authority, at all locations where and when the Contractor's vehicles leave or enter traffic. Each flagman should be an intelligent, English speaking person, properly trained, instructed and experienced in flagman duties, and should be uniformed as

specified herein. Each flagman should be subject to the approval of the Authority. Any flagman performing duties unsatisfactorily, in the opinion of the Authority, will be immediately removed from duty as a flagman and will be replaced by an approved flagman. Each flagman should wear an approved police-type uniform with billed cap. Uniform and cap should be navy blue. Over the uniform, the flagman should wear at all times, a sleeveless vest entirely covered with three inch width alternate vertical stripes of phosphorescent red and "Scotchlite" Silver Reflective Pressure-Sensitive Sheeting No. 3270 or approved equal. The Authority has no obligation to supervise or review flagmen. Be solely liable for the actions or inactions of flagmen under all circumstances.

Notify the Engineer one month in advance of a tentative date for establishing new traffic patterns. This date should be finalized 10 working days prior to the establishment of the new traffic patterns resulting from stage construction and 15 working days prior to the establishment of a detour for the closing of any roadways.

Do not park any construction vehicles atop the Conrail overpass footings (Sta. 50+00 to Sta. 57+00) during construction activities.

Designate and have approved by the Engineer construction entrance/exit locations.

This access is subject to the following conditions:

(1) This entrance/exit is for the convenience of the Contractor and is optional. The barrier should be continuous when no entrance/exit is installed.

(2) Only two entrance/exit locations will be permitted in each stage.

(3) Distance between two construction entrances should be 1,000 ft. minimum.

(4) Protect the work zone with a TMA when work zone is ahead or upstream from the construction entrance/exit.

(5) When the lane adjacent to the construction entrance/exit is opened to the traffic, the construction entrance/exit will be closed by placing a minimum of six barrels equally spaced across the opening.

(6) Place a barrier across the opening when the entrance/exit is no longer used.

(7) Delivery of material and equipment from and to construction zone is restricted to off peak time only.

T.6.3.3 DETOURS

Obtain approval of the Engineer and consent of the local authorities having jurisdiction before rerouting traffic over detours that are not shown on the Contract Drawings. Make all necessary arrangements with such authorities regarding the

establishment, maintenance and repair of such detours, the regulation and direction of traffic thereon, and signing. Furnish and erect adequate directional and detour signs, acceptable to the local authorities at the locations where such authorities may direct. All work in connection with such detours will be at no cost to the Authority.

T.6.3.4 MAINTAINING AND PROTECTING TRAFFIC:

A. It is the intent of this contract that traffic be maintained through the construction sites at all times. All lane and shoulder closures should be accomplished in accordance with the terms specified. The Contractor is cautioned that the time durations listed therein for lane closures may be curtailed by the Authority at any time that such closures constitute a hazard to traffic.

B. It is the intent of this contract that vehicular traffic be maintained at all times on Authority, State and local roads. Any deviation from existing traffic patterns will require the permission of the Authority, State and/or local authorities having jurisdiction there over.

C. Before beginning work on any phase of the project, install all specified warning signs, barricades, lights and other devices necessary to protect the public during that phase of his operation.

Erect and maintain all signs in a substantial manner to be approved by the Engineer and maintain so as to provide maximum visibility and legibility at all times.

During night time lane closings, place drums with attached low intensity flashing warning light three abreast across the tapered portion of each lane closure and every 250' along the lane closure.

Keep low intensity flashing warning lights lighted from dusk to dawn and when adverse atmospheric conditions cause the ambient light to be less than 20 footcandles.

Keep high intensity flashing warning lights lighted 24 hours a day.

Locate storage batteries or other bulk power sources as far as practicable from the traveled way and at ground level.

Place three high intensity flashing warning lights on the flared section of each precast concrete construction barrier configuration.

During night time lane closings, mount two high intensity flashing warning lights at the top of each traffic protection sign.

D. The Authority reserves the right, whenever the Contractor fails to open the minimum number of traffic lanes required by the contract, to order the Contractor off the roadway and to complete the work with its own forces or those of another Contractor when, in the judgement of the Chief Engineer, such action is necessary to protect the

interest of the Authority and the traveling public.

E. Maintain roadways and shoulders in areas within which the Contractor has actually commenced construction operations and which are reserved for traffic at the Contractor's expense, free from obstructions and in a smooth riding condition at all times, including seasonal shutdowns. However, snow removal will not be required of the Contractor. In areas within which the Contractor has not actually commenced construction operations, the Engineer may direct the Contractor to construct bituminous concrete patch in order to maintain roadways and shoulders reserved for traffic in a smooth riding condition. No payment will be made if the need to construct bituminous concrete patch resulted from the Contractor's operations.

F. Protect pedestrians, vehicular traffic, and property below the construction site in accordance with the section for under deck protection shielding prior to performing any construction.

Coordinate any short-term closures or relocations of pedestrian traffic with local authorities.

G. Prior to beginning a seasonal shutdown or any other prolonged work stoppage or when work is suspended as instructed by the Engineer, bring all excavated or removed areas within the traveled way, or adjacent thereto, to a grade compatible with the existing traveled way or to finished grade, as directed by the Engineer, with materials approved by the Engineer.

H. Control dust using water or other materials approved by the Engineer.

I. Repair any damage to newly constructed or existing pavements within the limits of the project or adjacent thereto, which in the opinion of the Engineer was caused by the Contractor's operations, as directed by the Engineer at the Contractor's expense or the repairs will be made by others and the cost of such repairs will be deducted from monies due the Contractor.

J. Lane closings will not be permitted if the Contractor fails to notify the Engineer in writing of his lane closings needs by noon Wednesday of the preceding week. In the event of emergency or unusual traffic conditions, permission will not be granted for short term closures.

K. Provide traffic directors (also referred to as flaggers) at certain locations as required to safely and successfully execute the approved Traffic Control Plans (TCP).

L. Any employees of the Contractor or other personnel associated with the performance of this contract whose duties require them to be on foot will be required to wear safety vests of the type specified for flaggers.

M. Before beginning any milling or paving work, submit to the Engineer the proposed method of assuring safe operation of any uncompleted section of roadway and upon

approval by the Engineer procure and have available at all times sufficient materials and/or devices to protect the uncompleted length of roadway. Approval by the Engineer will in no way relieve the Contractor of full responsibility for the adequacy of the proposed measures.

N. Traffic may not be shifted onto any surfaces newly paved with bituminous material until such surfaces have been completely compacted and cooled to 140 degrees F and new traffic stripes are in place and sufficiently dried so as not to create permanent wheel tracks when driven over. Coordinate paving operations so that the lane closings are removed by the hours stipulated in Special Provision Section SP-9.

O. Whenever the Contractor's vehicles operate on any roadway which is open to traffic, travel should always be with and not across or against the flow of such traffic. Do not park or stop vehicles in roadways except within work areas. During permissible work hours for lane closing, when a flagger is not on duty, automobiles operated solely for the transportation of supervisory personnel, flaggers, or approved inspectors will be allowed access to work sites provided that such vehicles are operated in a safe, nonhazardous manner.

P. Open any substantially completed section of roadway for the use and convenience of traffic as directed. The Engineer will determine when a portion of the roadway is substantially completed. When work is completed, immediately remove work zone traffic control devices.

Q. The Authority reserves the right to enter upon the project and, at its own expense, maintain the existing roadway and/or structures. This maintenance will be during the life of the project, but will not include those items which are the Contractor’s responsibility for the contract items of work for the accommodation of traffic. The Authority does not assume responsibility in any way for maintenance of traffic as a consequence of performing this roadway and/or maintenance.

R. Equipment and Material Storage. Comply with 67 Pa Code, Chapter 203.

S. Existing Authority Signs. Remove existing warning, regulatory, guide and directional signs, as required to accommodate construction operations. Do not remove Stop or Yield signs, unless an alternate type of traffic control is provided, such as flaggers, temporary traffic signals, etc. Continue the alternate traffic control until the Stop and/or Yield signs are replaced. Stake or mark sign locations or locate signs on construction drawings before removing any signs. Reinstall existing warning signs at appropriate locations within 4 hours of their removal. With the exception of Stop or Yield signs as herein noted, reinstall existing regulatory, guide and directional signs at appropriate locations within 24 hours of their removal.

T. Barricades. Where specified or indicated, furnish and install barricades in accordance with Section 203.53, 67 Pa Code, Chapter 203; except, all barricades to have a minimum of 270 square inches of reflective area facing traffic.

U. Treatment at Dropoffs: Comply with PennDOT Publication 408/2016-5, Section 901.3(j).

V. Protection of Workzone/Workers During Bridge Deck Resurfacing

(1) Workzone/Workers must be protected by temporary barrier during hydrodemolition and bridge deck resurfacing.

W. Work Area Pavement Markings. Unless otherwise specified in the Traffic Control Plan, furnish all material for and install pavement markings in work areas for all base course, flexible pavement, and rigid pavement construction operations as follows:

(1) Prior to terminating work each day, replace all lane lines and centerlines covered or destroyed during the day's operations with the applicable short-term pavement marking pattern or, on the final surface, the applicable standard pavement marking pattern shown on the Contract Drawings.

(2) All work area pavement markings to consist of 4-inch and 6-inch wide lines conforming to the requirements specified in PennDOT Publication 408/2016-5, Sections 962.2 and 962.3.

(3) Place standard pavement markings in the same location as the covered or destroyed pavement markings, unless otherwise specified in the Traffic Control Plan (TCP) or directed by the Engineer.

(4) Remove any pavement markings improperly placed and install in the correct location at no additional cost to the Authority.

(5) Remove existing painted markings by hydroblasting, sandblasting or the use of an approved erasing machine as specified in PennDOT Publication 408/2016-5, Section 963.

If using sandblasting equipment for removing the pavement markings, the size of the sand should not be larger than 00, size 40 or size 80. Do not wash residue sand left after sandblasting to the sides of the roadway. Remove and dispose of all sand and pavement marking materials from the pavement.

In case of the newly constructed pavement and/or as required by the Engineer in other cases, be careful not to damage the pavement surface. Such desired results may be achieved by adjusting the blasting pressure.

The Contractor may, after obtaining approval from the Engineer, use approved erasing machines in place of sandblasting equipment for removing the pavement striping.

X. Temporary Strapping Down of Inlet Grates. Strap down existing and proposed inlet grates that will be driven over during construction as indicated on the Contract

Drawings.

END OF SECTION

SECTION T.7 TOW TRUCKS

T.7.1 GENERAL

T.7.1.1 DESCRIPTION

This work is the furnishing of three tow trucks or three flatbed trucks for the removal of mechanically disabled vehicles, illegally parked vehicles and those interfering with any work operation. This includes any vehicle obstructing traffic within the work zone. This towing service shall be provided throughout the contract period.

T.7.1.2 SUBMITTALS

Submit certification that the tow trucks or flatbed trucks conform to the specified requirements, and that the tow trucks or flatbeds meet or exceed all Federal and Commonwealth of Pennsylvania safety, health, lighting and noise regulations and standards in effect and applicable to equipment furnished at the time of manufacture.

T.7.2 MATERIALS

Tow trucks or flatbed trucks shall be of a type approved by the Engineer, equipped with power winches, and capable of moving any legally licensed vehicle. Provide three tow trucks or three flatbed trucks and operators stationed on the project at locations approved by the Engineer, so as to be promptly available for towing and removing disabled or illegally parked vehicle(s).

Two tow trucks or two flatbed trucks shall be capable of towing and removing vehicles weighing up to ten thousand (10,000) pounds gross vehicle weight and be capable of removing vehicles which cannot be towed.

Supply one tow truck or one flatbed truck capable of removing vehicles weighing up to 80,000 pounds gross vehicle weight and be capable of removing vehicles which cannot be towed.

T.7.3 METHOD OF CONSTRUCTION

Monitor the roadways throughout the work zone to promptly identify incidents and disabled vehicles, and immediately notify the DRPA Police and the Engineer. Immediately dispatch a tow truck to remove the vehicle to a staging area designated by the Engineer outside the work zone. Towing and/or removing shall be accomplished promptly and without damage to the vehicle. Provide a five minute response time; response is defined as a vehicle under operation on DRPA property within five minutes. In addition, provide towing service as necessary when authorized and/or ordered by DRPA Police.

Have three trucks and operators on site on a continuous basis between 6AM and 7PM, Monday thru Friday. At all other times, have one truck and operator on site on a continuous basis except during winter shutdown.

END OF SECTION

SECTION T.8 TEMPORARY INLET GRATE

T.8.1 GENERAL

T.8.1.1 DESCRIPTION

This work is the investigating of locations, furnishing, installing, maintaining and removing temporary inlet grates and the adjustment paving that is necessary to provide a "smooth" travel over existing inlets in the shoulder area of the existing pavement.

T.8.2 MATERIALS

A. Inlet Grate-- As shown on the PennDOT Publication 72M Standard Drawings RC-45M, either structural steel, PennDOT Publication 408 Section 1105.02(a)3.c, or gray, malleable, or ductile iron as specified in PennDOT Publication 408 Section 1105.02(h). For Type M Frames, provide either structural steel as specified in PennDOT Publication 408 Section 1105.02(a)2 or gray, malleable, or ductile iron as specified in PennDOT Publication 408 Section1105.02(h). Certify as specified in PennDOT Publication 408 Section 106.03(b)3. Coat structural steel grates with bituminous paint in the shop or in the field, before placement. Coat structural steel frames with bituminous paint when placing in the concrete inlet top. Cover frames and grates completely with no pin holes or voids. As an alternative to bituminous paint, hot dip galvanize structural steel grates and frames as specified in PennDOT Publication 408 Section 1105.02(s).

B. SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE (LEVELING), PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, SRL-E

T.8.3 METHOD OF CONSTRUCTION

A. Prior to placement of roadway staging that will have through-traffic traveling on existing shoulders; a field investigation shall be conducted to determine the existing inlets that will require fill to be added above the depressed roadway drainage surface at various locations on the roadway shoulders.

B. Depressions shall be measured by placing a 10-foot long straightedge over the inlet area.

C. If the depression is greater than one-inch below the straightedge, place an approved temporary inlet grate on the existing inlet grate and secure with bolts. Place bituminous material to provide a “smooth” riding surface.

D. The “strapping” down of the existing inlet grate is included in Section T.6.

END OF SECTION

SECTION T.9 NOT USED

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SECTION T.10 MILLING OF BITUMINOUS PAVEMENT SURFACE, 2" DEPTH, MILLED MATERIAL RETAINED BY CONTRACTOR

T.10.1 GENERAL

T.10.1.1 DESCRIPTION

This work is the milling of an existing bituminous pavement surface to the depth indicated.

T.10.1.2 STANDARDS

In accordance with PennDOT Publication 408/2016-5, Section 491.

T.10.1.3 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 491.

T.10.2 MATERIALS

None

T.10.3 METHOD OF CONSTRUCTION:

T.10.3.1 Equipment. Use a milling machine designed and built for this type of work. Provide a machine with an effective automatic grade and slope control system and having the capacity to mill concrete patches.

T.10.3.2 Milling Operation. Mill so the finished surface is free from gouges, grooves, and ridges and is in accordance with the surface tolerance of 3/16 inch maximum. Test the finished surface with a 10 foot straight edge whenever the Engineer suspects an area is deficient or irregular. To facilitate traffic control, pick-up and move milled material, as specified, immediately after the milling operations. Use care to remove the existing bituminous material around all utility facilities within the work areas. Repair or replace, to the satisfaction of the utility owner, utility facilities which are damaged by the milling operation. Control the rate of milling to avoid tearing of the mat, resulting in chunky and nonuniformly milled material. Separate oversize and chunky milled material, as directed. Keep the milled pavement surface free of all loose materials and dust.

T.10.3.3 Disposition of Milled Material. Satisfactorily dispose of the milled material off-site.

END OF SECTION

SECTION T.11 NOT USED

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SECTION T.12 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, 2" DEPTH, SRL-E

T.12.1 GENERAL

T.12.1.1 DESCRIPTION

This work is the standard and RPS construction of plant-mixed HMA on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor.

T.12.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 409.

T.12.2 MATERIALS

T.12.2.1 In accordance with PennDOT Publication 408/2016-5, Section 409.2.

T.12.3 METHOD OF CONSTRUCTION

T.12.3.1 In accordance with PennDOT Publication 408/2016-5, Section 409.3.

END OF SECTION

SECTION T.13 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, 2" DEPTH, SRL-E

T.13.1 GENERAL

T.13.1.1 DESCRIPTION

This work is the standard and RPS construction of plant-mixed HMA on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor.

T.13.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 409.

T.13.2 MATERIALS

T.13.2.1 In accordance with PennDOT Publication 408/2016-5, Section 409.2.

T.13.3 METHOD OF CONSTRUCTION

T.13.3.1 In accordance with PennDOT Publication 408/2016-5, Section 409.3.

END OF SECTION

SECTION T.14 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE (LEVELING), PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, SRL-E

T.14.1 GENERAL

T.14.1.1 DESCRIPTION

This work is the standard and RPS construction of plant-mixed HMA on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor.

T.14.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 409.

T.14.2 MATERIALS

T.14.2.1 In accordance with PennDOT Publication 408/2016-5, Section 409.2.

T.14.3 METHOD OF CONSTRUCTION

T.14.3.1 In accordance with PennDOT Publication 408/2016-5, Section 409.3.

END OF SECTION

SECTION T.15 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 25.0 MM MIX, 3" DEPTH

T.15.1 GENERAL

T15.1.1 DESCRIPTION

This work is the standard and RPS construction of plant-mixed HMA on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor.

T.15.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 409.

T.15.2 MATERIALS

T.15.2.1 In accordance with PennDOT Publication 408/2016-5, Section 409.2.

T.15.3 METHOD OF CONSTRUCTION

T.15.3.1 In accordance with PennDOT Publication 408/2016-5, Section 409.3.

END OF SECTION

SECTION T.16 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 37.5 MM MIX, 8" DEPTH

T.16.1 GENERAL

T.16.1.1 DESCRIPTION

This work is the standard and RPS construction of plant-mixed HMA on a prepared surface using a volumetric mixture design developed with the Superpave Gyratory Compactor.

T.16.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 309.

T.16.2 MATERIALS

T.16.2.1 In accordance with PennDOT Publication 408/2016-5, Section 309.2.

T.16.3 METHOD OF CONSTRUCTION

T.16.3.1 In accordance with PennDOT Publication 408/2016-5, Section 309.3.

END OF SECTION

SECTION T.17 SUBBASE 6" DEPTH (NO. 2A)

T.17.1 GENERAL

T.17.1.1 DESCRIPTION

This work is preparation of subgrade, as specified in PennDOT Publication 408/2016-5, Section 210, and construction of a compacted aggregate subbase, including the application of bituminous prime coat, where required.

T.17.1.2 STANDARDS

In accordance with PennDOT Publication 408/2016-5, Section 350 and 461.

T.17.1.3 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 350 and 461.

T.17.2 MATERIALS

T.17.2.1 In accordance with PennDOT Publication 408/2016-5, Section 350.2 and 461.2.

T.17.3 METHOD OF CONSTRUCTION

T.17.3.1 In accordance with PennDOT Publication 408/2016-5, Section 350.3 and 461.3.

END OF SECTION

SECTION T.18 SUBBASE 11" DEPTH (NO. 2A)

T.18.1 GENERAL

T.18.1.1 DESCRIPTION

This work is preparation of subgrade, as specified in PennDOT Publication 408/2016-5, Section 210, and construction of a compacted aggregate subbase, including the application of bituminous prime coat, where required.

T.18.1.2 STANDARDS

In accordance with PennDOT Publication 408/2016-5, Section 350 and 461.

T.18.1.3 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 350 and 461.

T.18.2 MATERIALS

T.18.2.1 In accordance with PennDOT Publication 408/2016-5, Section 350.2 and 461.2.

T.18.3 METHOD OF CONSTRUCTION

T.18.3.1 In accordance with PennDOT Publication 408/2016-5, Section 350.3 and 461.3.

END OF SECTION

SECTION T.19 BITUMINOUS TACK COAT

T.19.1 GENERAL

T.19.1.1 DESCRIPTION

This work is the conditioning and treating of an existing surface with an application of bituminous bonding material.

T.19.1.2 STANDARDS

In accordance with PennDOT Publication 408/2016-5, Section 460.

T.19.1.3 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 460.

T.19.2 MATERIALS

T.19.2.1 In accordance with PennDOT Publication 408/2016-5, Section 460.2.

T.19.3 METHOD OF CONSTRUCTION

T.19.3.1 In accordance with PennDOT Publication 408/2016-5, Section 460.3.

END OF SECTION

SECTION T.20 CEMENT CONCRETE SIDEWALK, 4" DEPTH

T.20.1 GENERAL

T.20.1.1 DESCRIPTION

This work is construction cement concrete sidewalk on an aggregate bed.

T.20.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Publication 408/2016-5
Section 350 - Aggregate
Section 704 - Cement Concrete
Section 705 - Joint Materials
Section 711 - Concrete Curing Material and Admixtures
Section 1001 - Cement Concrete Structures

T.20.1.3 SUBMITTALS

A. Certification. Submit material certifications that the following conform to the specified requirements:

Class A Concrete
Joint Materials
Aggregate

T.20.1.4 TESTING AND INSPECTION

Material used for cement concrete construction shall be tested by an independent testing laboratory that is approved by the Engineer. This laboratory shall be retained and be paid for by the Contractor. Failure to detect defective work will not prevent rejection when a defect is discovered, nor will it obligate the Engineer for final acceptance.

T.20.2 MATERIAL

PennDOT Publication 408/2016-5

A. Class A Cement Concrete--Section 704

B. Premolded Expansion Joint Filler--Section 705.1

C. Concrete Curing Compound--Sections 711.2(a)

D. Curing and Protective Covers--Section 711.1

E. Mortar--Section 1001.2(d)

F. Aggregate--Section 350.2

T.20.3 METHOD OF CONSTRUCTION

T.20.3.1 General.
As shown on the PennDOT Standard Drawings and as follows:

T.20.3.2 Preparation of Foundation.
Excavate, as required, and form the foundation at a depth 10 inches below and parallel with the finished surface of the sidewalk. When directed, remove unsuitable material in accordance with T.24 and T.25. Thoroughly compact the foundation, finish to a firm, even surface; moisten if required.

T.20.3.3 Placing Aggregate Bed.
Spread aggregate on the prepared foundation to form a thoroughly compacted bed 6 inches deep.

T.20.3.4 Forms.
Use acceptable wood or metal forms extending the full depth of the concrete.

T.20.3.5 Concrete.
As specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3

A. Place concrete 4 inches deep. Strike off and finish, as specified in PennDOT Publication 408/2016-5, Section 501, except that manual operations are allowed and a light broom finish applied.

B. Form outside edges and joints with a 1/4-inch radius edging tool.

C. Form transverse dummy joints at 5-foot intervals, approximately 1/8-inch wide and at least 1 inch deep.

D. When required, construct cement concrete sidewalk as indicated for curb ramp. Finish cement concrete sidewalk with coarse broomed texture transverse to the slope of the curb ramp. Transverse dummy joints are not required for curb ramps.

T.20.3.6 Expansion Joints.
Place ½-inch premolded, expansion joint material for the full depth of the pavement, opposite expansion joints in adjacent curb, between the sidewalk and curb, and between the sidewalk and rigid structures.

T.20.3.7 Removal of Forms.

Do not remove side forms until at least 12 hours after placing concrete. After removal of forms, fill minor honeycombed areas with mortar. As directed, remove and replace defective major honeycombed areas.

T.20.3.8 Backfilling.

After concrete has cured for at least 72 hours, backfill spaces adjacent to the sidewalk, using acceptable embankment material, as specified in SP.17. Repair or replace existing pavement, curb and sidewalk damaged due to construction. Satisfactorily dispose of unsuitable and surplus materials.

END OF SECTION

SECTION T.21 BITUMINOUS SHOULDER RUMBLE STRIPS

T.21.1 GENERAL

T.21.1.1 DESCRIPTION

This work is the construction of rumble strips on the shoulder.

T.21.1.3 STANDARDS

In accordance with PennDOT Publication 408/2016-5, Section 660.

T.21.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 660.

T.21.2 MATERIALS

T.21.2.1 In accordance with PennDOT Publication 408/2016-5, Section 660.2.

T.21.3 METHOD OF CONSTRUCTION

T.21.3.1 In accordance with PennDOT Publication 408/2016-5, Section 660.3.

END OF SECTION

SECTION T.22 NO. 57 COARSE AGGREGATE

T.22.1 GENERAL

T.22.1.1 DESCRIPTION

This work is the furnishing and placing of coarse aggregate at the locations as indicated.

T.22.1.2 QUALITY ASSURANCE

In accordance with PennDOT Standard Publication 408/2016-5, Section 703 – Aggregates.

T.22.2 MATERIALS

In accordance with PennDOT Standard Publication 408/2016-5, Section 703.2 - Coarse Aggregate

T.22.3 METHOD OF CONSTRUCTION

As shown on the Construction Detail Plans and in accordance with PennDOT Publication 408/2016-5, Section 703.

END OF SECTION

SECTION T.23 NOT USED

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SECTION T.24 CLASS 1 EXCAVATION

T.24.1 GENERAL

T.24.1.1 DESCRIPTION

This work is excavation for roadways, roadway appurtenances, and structures as follows:

A. Excavation as shown on the Standard Drawings, for roadways, shoulders, ditches, drainage structures, stream channels, grade separation structures, retaining walls, and wingwalls.
B. Excavation, as indicated or directed, for benches and for the removal of existing pavements not being rehabilitated.
C. Excavation, as indicated or directed, for the removal of unsuitable material having a bottom width of 8 feet or more.
D. Excavation, as indicated or directed, to allow for the placement of topsoil.
E. Excavation and stockpiling, as indicated or directed, for the removal of topsoil other than the first 8 inches, which are incidental to the clearing and grubbing operations specified in Section 201.
F. Removal of unforeseen slides and rock ledges.
G. Removal of stone fences, piles of dirt or stones, individual boulders, and any portions of structures above the natural ground, when in excess of 1/2 cubic yard volume.

T.24.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.24.1.3 QUALITY ASSURANCE

Conform to the following:
PennDOT Publication 408/2016-5

T.24.2 MATERIALS

None.

T.24.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 203.3 and as follows:

T.24.3.1 Breaking Existing Pavements. Break existing pavements, more than 3 feet below the finished grade, as follows:

A. Break bituminous pavements to a maximum size of one square foot and recompact.

B. Break concrete pavements to a maximum size of one square yard.

C. Scarify bituminous, surface-treated roadways to a depth of 6 inches and recompact.

T.24.3.2 Backfill. Backfill, as required, in accordance with the requirements of Section T.29 and Section T.30.

T.24.3.3 Management of Material. Properly manage all material removed to the satisfaction of the Engineer and in accordance with all related sections indicated herein.

END OF SECTION

SECTION T.25 CLASS 1B EXCAVATION

T.25.1 GENERAL

T.25.1.1 DESCRIPTION

This work is excavation for roadways, roadway appurtenances, and structures as follows:

A. For roadway rehabilitation, sawcutting and removal of existing pavement to neat lines, as indicated or directed.

T.25.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.25.1.3 QUALITY ASSURANCE

Conform to the following:
PennDOT Publication 408/2016-5

T.25.2 MATERIALS

None.

T.25.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 203.3, and as follows:

Properly manage all material removed to the satisfaction of the Engineer and in accordance with all related sections indicated herein.

END OF SECTION

SECTION T.26 CLASS 2 EXCAVATION

T.26.1 GENERAL

T.26.1.1 DESCRIPTION

This work is the excavation for ditches, stream channels, culverts, drains, and structures as follows:

A. Excavation for inlet, outlet, and parallel ditches; stream channels; structures removed below the ground surface and not replaced with new structures; spillways; and half-circle pipe.

T.26.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.26.1.3 QUALITY ASSURANCE

Conform to the following:
PennDOT Publication 408/2016-5

T.26.2 MATERIALS

None.

T.26.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 204.3, and as follows:

Properly manage all material removed to the satisfaction of the Engineer and in accordance with all related sections indicated herein.

END OF SECTION

SECTION T.27 CLASS 4 EXCAVATION

T.27.1 GENERAL

T.27.1.1 DESCRIPTION

This work is the excavation for ditches, stream channels, culverts, drains, and structures as follows:

A. Excavation for pipe culverts; pipe-arches; metal plate pipe; metal plate pipe-arches; standard endwalls for pipe culverts and pipe-arches; and excavation in excess of the standard depth for pavement base drains, pipe underdrains, subsurface drain outlets, and subgrade drains.

T.27.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.27.1.3 QUALITY ASSURANCE

Conform to the following:
PennDOT Publication 408/2016-5.

T.27.2 MATERIALS

None.

T.27.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 204.3 and as follows.

Properly manage all material removed to the satisfaction of the Engineer and in accordance with all related sections indicated herein.

END OF SECTION

SECTION T.28 TOPSOIL, FURNISHED AND PLACED

T.28.1 GENERAL

T.28.1.1 DESCRIPTION

This work is the furnishing and placing of topsoil from outside the project as indicated.

T.28.1.2 QUALITY ASSURANCE

Conform to the following:
AASHTO Standards
PennDOT Publication 408/2016-5, Section 350.3.

T.28.1.3 SUBMITTALS

Submit certification that the topsoil conforms to the specified requirements.

T.28.2 MATERIALS

Topsoil. Acceptable friable loam that is reasonably free of subsoil, claylumps, brush, roots, weeds, other objectionable vegetation, stones, other foreign material larger than 2 inches in any dimension, litter, and/or other material unsuitable or harmful to plant growth and containing not less than 2.0% nor more than 10.0% organic matter, as determined in accordance with AASHTO-T194.

Provide topsoil meeting the following grading analysis:

Sieve	Minimum Percent Passing
2"	100
No. 4	75
No. 10	60

Sand, silt, clay material passing the No. 10 sieve, as defined by AASHTO-T88 and within the following ranges:

	Minimum Percent	Maximum Percent
Sand	5	70
Silt	10	70
Clay	5	36

Obtain topsoil from outside the right-of-way, where soil quality has proven ability to grow crops. Prior to topsoil removal, obtain acceptance for the quality of the source, for the depth of the topsoil to be removed, and for the method of removal. Recondition areas from which topsoil was obtained.

T.28.3 METHOD OF CONSTRUCTION

A. Preparation of Areas to be Topsoiled. Grade the areas to be covered by topsoil. Using acceptable methods, loosen soil to a depth of 2 inches before placing the topsoil. Remove stones and other foreign material 2 inches or larger in any dimension. Remove and satisfactorily dispose of unsuitable and surplus material.

B. Placing and Spreading Topsoil. Place topsoil on the prepared areas and, unless otherwise indicated, spread and compact to a 4-inch uniform depth ± 1-1/2 inches. Compact with a roller weighing not over 120 pounds per foot width of roller or by other acceptable methods, as directed. Remove overdepth topsoil, unless otherwise agreed upon, in writing. Do not place topsoil in wet or frozen condition.

END OF SECTION

SECTION T.29 FOREIGN BORROW EXCAVATION

T.29.1 GENERAL

T.29.1.1 DESCRIPTION

A. This work is excavation or obtaining embankment material from approved borrow areas acquired, in accordance with Sections T.24 , T.25, T.26, T.27 or from other approved sources for the construction of embankments or backfills.

B. Foreign Borrow Excavation shall include excavation or obtaining material used in specific items of work and designated by quality, size, and/or gradation, obtained from sources outside the limits of the project, that cannot be measured before and after excavation.

T.29.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.29.2 MATERIALS AND EQUIPMENT

NOT USED

T.29.3 METHOD OF CONSTRUCTION

T.29.3.1 GENERAL

A. When the project excavation material is insufficient to complete the embankments or backfills as indicated in the Contract Drawings, or does not meet the physical requirements of embankment or backfill material, the Contractor shall obtain sufficient material to complete the work.

B. The Contractor shall not use material from a borrow excavation until all suitable and available project excavation material is used, unless otherwise directed by the Engineer.

C. If satisfactory material is available on the project, the Engineer may, upon written request from the Contractor, authorize, in writing, widening areas adjacent to slopes to obtain a portion or all of the excavation material in place of obtaining materials from borrow.

D. The Contractor shall haul material from borrow excavation of other sources for placement in embankment or for backfill.

E. The Contractor shall restore borrow areas by removing the topsoil and stockpiling it for replacement once the removal of borrow material has been completed.

F. Properly manage all common material removed to the satisfaction of the Engineer and in accordance with all related sections indicated herein.

T.29.3.2 FOREIGN BORROW EXCAVATION

A. When foreign borrow excavation is required, do not begin operations until the material and placement sequence is accepted in writing by the Engineer, and an Erosion and Sediment Pollution Control Plan is accepted by the Authority.

B. If Contractor imports foreign borrow into the ROW for any reason, Contractor must demonstrate soil quality to the Engineer in accordance with Certification of Clean Fill Form FP-001 Section 2A or 2B prior to delivery of material. The Engineer will not accept soils qualified under Form FP-001 Section 2C (environmental due diligence without soil test results). Soil quality will be demonstrated through a sampling program that complies with the Management of Fill Policy Appendix A procedures and laboratory analysis of those samples for the following suites of parameters:

- Priority Pollutant List (PPL) Volatile Organic Compounds (VOCs) – EPA Method SW846 8260B;
- PPL Semi-Volatile Organic Compounds (SVOCs) – EPA Method SW846 8270D;
- PPL Metals, plus mercury – EPA Methods SW846 6010B and 7471
- Polychlorinated Biphenyls – EPA Method SW846 8082A;
- RCRA parameters: Ignitability, Reactivity and Corrosivity; (US EPA Methods: 1010/1020, generator knowledge and 1110, respectively,
- RCRA Metals Toxicity - EPA Method 1311;
- PADEP leaded/unleaded gasoline, diesel and kerosene suites of parameters
- All data must be presented to the Engineer for approval prior to delivery of the material to the site. All sampling and laboratory analysis performed by the Contractor to demonstrate imported Clean Fill meets Engineer’s requirements is at the expense and risk of the Contractor.

END OF SECTION

SECTION T.30 COMMON BORROW EXCAVATION

T.30.1 GENERAL

T.30.1.1 DESCRIPTION

A. This work is excavation of or obtaining embankment material from approved borrow areas acquired, in accordance with Sections T.24 , T.25, T.26, T.27 or from other approved sources for the construction of embankments or backfills.

B. Common Borrow Excavation shall include Excavation of suitable material as specified in PennDOT Publication 408/2016-5, Section 206.2, from borrow areas that can be measured before and after excavation. Common Borrow Excavation also includes the removal of topsoil from borrow areas and stockpiling as specified in PennDOT Publication 408/2016-5, Section 801.

T.30.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.30.2 MATERIALS AND EQUIPMENT

In accordance with PennDOT Publication 408/2016-5, Section 205.

T.30.3 METHOD OF CONSTRUCTION

T.30.3.1 In accordance with PennDOT Publication 408/2016-5, Section 205.3.

Properly manage all material removed to the satisfaction of the Engineer and in accordance with all related sections indicated herein.

END OF SECTION

SECTION T.31 SOIL AMENDMENT

T.31.1 GENERAL

T.31.1.1 DESCRIPTION – This work is the construction of areas designated with the best management practice Soil Amendment.

T.31.1.2 RELATED SECTIONS

A. T.26 CLASS 2 EXCAVATION
B. T.212 SEEDING AND SOIL SUPPLEMENTS FORMULA L
C. T.213 TEMPORARY SHORT-TERM, ROLLED EROSION CONTROL PRODUCT, TYPE 2D
D. T.214 MULCHING - STRAW

T.31.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.31.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 805.

T.31.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 805.

T.31.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 805.

T.31.2 MATERIALS

Compost – Mulching – Spent Mushroom Soil Compost, in accordance with PennDOT Publication 408/2016-5, Section 805.

T.31.3 METHOD OF CONSTRUCTION

Excavate to an elevation 8 inches below finished grade. Stockpile as indicated at acceptable locations within the limit of disturbance. Do not compact and do not stockpile in a wet or frozen condition.

Rip exposed soil in a 90-degree grid to a minimum depth of 8 inches with a parallelogram multi-shanked or solid-shanked ripper. Space ripper grid channel 12 inches to 36 inches apart.

Ripping operations not to encroach within 10 feet of tree drip lines and underground utilities with clearance depth less than 18 inches from the bottom of the rip channels.

Add 6 inches of amended soil consisting of 2 inches of compost with 4 inches of the stockpiled excavated material.

Till amended soil layer with underlying soil to a depth of 8 inches with a rotary tiller.

Add additional compost to bring the area to grade.

Permanently seed and stabilize in accordance with the Erosion and Sediment Pollution Control Plan.

END OF SECTION

SECTION T.32-38 NOT USED

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SECTION T.39 PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB – 4" CONCRETE CURB

T.39.1 GENERAL

T.39.1.1 DESCRIPTION

This work is removal of existing curb and construction of plain cement concrete curb.

T.39.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Standard Publication 408/2016-5
Section 350 - Subbase
Section 501 - Reinforced or Plain Cement Concrete Pavements
Section 704 - Cement Concrete
Section 705 - Joint Material
Section 711 - Concrete Curing Material and Admixtures
Section 1001 - Cement Concrete Structures

T.39.1.3 SUBMITTALS

A. Submit a cement concrete mix design for Class A concrete to the Engineer for approval prior to the start of work.

B. Submit manufacture's descriptive product data and current specifications covering products and installation instructions for the following:

Premolded Expansion Joint Filler
Concrete Curing Compound
Joint Spalling Compound

T.39.1.4 TESTING AND INSPECTION

Material used for plain cement concrete curb construction shall be tested by an independent testing laboratory that is approved by the Engineer. This laboratory shall be retained and be paid for by the Contractor. Failure to detect defective work will not prevent rejection when a defect is discovered, nor will it obligate the Engineer for final acceptance.

T.39.2 MATERIALS

PennDOT Standard Publication 408/2016-5

A. Class A Cement Concrete--Section 704
B. Premolded Expansion Joint Filler--Section 705.1
C. Curing and Protecting Covers--Section 711.1
D. Concrete Curing Compound--Section 711.2(a)
E. Mortar--Section 1001 .2(d)
F. Joint Sealing Material--Section 705.4(b) or (c)
J. Subbase Material--Section 350.2

T.39.3 METHOD OF CONSTRUCTION

As shown on the included Standard Drawings (RC-50 and RC-64) and Typical Section Plans, as specified in the applicable parts of PennDOT Standard Publication 408/2016-5, Section 1001.3, and as follows:

T.39.3.1 Excavation and Subbase. Excavate to the required depth, place subbase, as indicated to the depth of the shoulder subbase, compact the subbase material upon which the curb is to be constructed to a firm, even surface.

T.39.3.2 Forms. Use acceptable metal forms, except on sharp curves and short tangent sections, where wood forms may be used. Use forms which will not discolor the concrete.

T.39.3.3 Placing and Finishing Concrete. Place the concrete in the forms in layers not exceeding 5 inches in depth when spading, or layers not exceeding 15 inches in depth when using a vibrator to eliminate voids. Provide drainage openings through the curb, at the elevation and of the size required, where indicated or directed. Smoothly and evenly finish the top surface of the curb, using a wood float. While the concrete is still plastic, round the edges of the face and back of the curb.

T.39.3.4 Curb Machine. The concrete curb may be placed with an acceptable, self-propelled machine.

Uniformly feed the concrete to the machine so the concrete maintains the shape of the section, without slumping after extrusion.

Voids or honeycomb on the surface of the finished curb will not be allowed. Immediately after extrusion, perform any additional surface finishing required.

T.39.3.5 Joints. Form or saw contraction joints 3/16-inch wide and 2 inches deep. Saw as soon as possible after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking occurs in the concrete. The depth of saw

cut may be decreased at the edge adjacent to the pavement to obtain a maximum depth without pavement damage.

Tool the edges of construction joints to a 1/4-inch radius.

Place 3/4-inch premolded expansion joint material, cut to the cross-sectional area of the curb, at structures, and at the end of the work day.

Seal joints, as specified in PennDOT Publication 408/2016-5, Section 501.

T.39.3.6 Removal of Forms. Do not remove forms until such time it will not be detrimental to the concrete. Correct irregular surfaces by rubbing with a carborundum stone. Brush finishing or plastering will not be permitted. Fill minor defects with mortar.

T.39.3.7 Backfilling and Embankment. As soon as possible after the removal of forms, backfill the voids in front and back of the curb, using acceptable embankment material, as specified in Section SP.17.

Complete embankments in back of raised curbs, as indicated, and as specified in Section SP.17, except carefully compact the embankment by means of mechanical tampers, or rollers, if permitted, not exceeding 8 tons.

Dispose of unsuitable and surplus material.

END OF SECTION

SECTION T.40 PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB – 8" CONCRETE CURB

T.40.1 GENERAL

T.40.1.1 DESCRIPTION

This work is removal of existing curb and construction of plain cement concrete curb.

T.40.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Standard Publication 408/2016-5
Section 350 - Subbase
Section 501 - Reinforced or Plain Cement Concrete Pavements
Section 704 - Cement Concrete
Section 705 - Joint Material
Section 711 - Concrete Curing Material and Admixtures
Section 1001 - Cement Concrete Structures

T.40.1.3 SUBMITTALS

A. Submit a cement concrete mix design for Class A concrete to the Engineer for approval prior to the start of work.

B. Submit manufacture's descriptive product data and current specifications covering products and installation instructions for the following:

Premolded Expansion Joint Filler
Concrete Curing Compound
Joint Spalling Compound

T.40.1.4 TESTING AND INSPECTION

Material used for plain cement concrete curb construction shall be tested by an independent testing laboratory that is approved by the Engineer. This laboratory shall be retained and be paid for by the Contractor. Failure to detect defective work will not prevent rejection when a defect is discovered, nor will it obligate the Engineer for final acceptance.

T.40.2 MATERIALS

PennDOT Standard Publication 408/2016-5

A. Class A Cement Concrete--Section 704
B. Premolded Expansion Joint Filler--Section 705.1
C. Curing and Protecting Covers--Section 711.1
D. Concrete Curing Compound--Section 711.2(a)
E. Mortar--Section 1001 .2(d)
F. Joint Sealing Material--Section 705.4(b) or (c)
J. Subbase Material--Section 350.2

T.40.3 METHOD OF CONSTRUCTION

As shown on the included Standard Drawings (RC-50 and RC-64) and Typical Section Plans, as specified in the applicable parts of PennDOT Standard Publication 408/2016-5, Section 1001.3, and as follows:

T.40.3.1 Excavation and Subbase. Excavate to the required depth, place subbase, as indicated to the depth of the shoulder subbase, compact the subbase material upon which the curb is to be constructed to a firm, even surface.

T.40.3.2 Forms. Use acceptable metal forms, except on sharp curves and short tangent sections, where wood forms may be used. Use forms which will not discolor the concrete.

T.40.3.3 Placing and Finishing Concrete. Place the concrete in the forms in layers not exceeding 5 inches in depth when spading, or layers not exceeding 15 inches in depth when using a vibrator to eliminate voids. Provide drainage openings through the curb, at the elevation and of the size required, where indicated or directed. Smoothly and evenly finish the top surface of the curb, using a wood float. While the concrete is still plastic, round the edges of the face and back of the curb.

T.40.3.4 Curb Machine. The concrete curb may be placed with an acceptable, self-propelled machine.

Uniformly feed the concrete to the machine so the concrete maintains the shape of the section, without slumping after extrusion.

Voids or honeycomb on the surface of the finished curb will not be allowed. Immediately after extrusion, perform any additional surface finishing required.

T.40.3.5 Joints. Form or saw contraction joints 3/16-inch wide and 2 inches deep. Saw as soon as possible after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking occurs in the concrete. The depth of saw

cut may be decreased at the edge adjacent to the pavement to obtain a maximum depth without pavement damage.

Tool the edges of construction joints to a 1/4-inch radius.

Place 3/4-inch premolded expansion joint material, cut to the cross-sectional area of the curb, at structures, and at the end of the work day.

Seal joints, as specified in PennDOT Publication 408/2016-5, Section 501.

T.40.3.6 Removal of Forms. Do not remove forms until such time it will not be detrimental to the concrete. Correct irregular surfaces by rubbing with a carborundum stone. Brush finishing or plastering will not be permitted. Fill minor defects with mortar.

T.40.3.7 Backfilling and Embankment. As soon as possible after the removal of forms, backfill the voids in front and back of the curb, using acceptable embankment material, as specified in Section SP.17.

Complete embankments in back of raised curbs, as indicated, and as specified in Section SP.17, except carefully compact the embankment by means of mechanical tampers, or rollers, if permitted, not exceeding 8 tons.

Dispose of unsuitable and surplus material.

END OF SECTION

SECTION T.41 CURB TRANSITION FROM 4" CONCRETE CURB TO 8" CONCRETE CURB

T.41.1 GENERAL

T.41.1.1 DESCRIPTION

This work is construction of plain cement concrete curb transitions from 4” reveal to 8” reveal.

T.41.1.2 QUALITY ASSURANCE

Refer to Section T.40.1.2.

T.41.1.3 SUBMITTALS

Refer to Section T.40.1.3.

T.41.1.4 TESTING AND INSPECTION

Refer to Section T.40.1.4.

T.41.2 MATERIALS

Refer to Section T.40.2.

T.41.3 METHOD OF CONSTRUCTION

As shown on the Standard Drawings (RC-50 and RC-64) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.40.3.

END OF SECTION

SECTION T.42 CURB END TERMINAL

T.42.1 GENERAL

T.42.1.1 DESCRIPTION

This work is construction of plain cement concrete curb end terminals.

T.42.1.2 QUALITY ASSURANCE

Refer to Section T.40.1.2.

T.42.1.3 SUBMITTALS

Refer to Section T.40.1.3.

T.42.1.4 TESTING AND INSPECTION

Refer to Section T.40.1.4.

T.42.2 MATERIALS

Refer to Section T.40.2.

T.42.3 METHOD OF CONSTRUCTION

As shown on the PennDOT Standard Drawings (RC-50 and RC-64) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.40.3.

END OF SECTION

SECTION T.43 DEPRESSED CURB

T.43.1 GENERAL

T.43.1.1 DESCRIPTION

This work is construction of plain cement concrete depressed curb.

T.43.1.2 QUALITY ASSURANCE

Refer to Section T.40.1.2.

T.43.1.3 SUBMITTALS

Refer to Section T.40.1.3.

T.43.1.4 TESTING AND INSPECTION

Refer to Section T.40.1.4.

T.43.2 MATERIALS

Refer to Section T.40.2.

T.43.3 METHOD OF CONSTRUCTION

As shown on the PennDOT Standard Drawings (RC-50 and RC-64) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.40.3.

END OF SECTION

SECTION T.44-51 NOT USED

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SECTION T.52 50” CONCRETE GLARE SCREEN

T.52.1 GENERAL

T.52.1.1 DESCRIPTION

This work is construction of symmetrical concrete glare screen, including all materials, delineators, and associated hardware.

T.52.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Publication 408/2016-5
- Section 350 - Subbase
- Section 503 - Protective Coating for Cement Concrete Pavement
- Section 703 - Aggregates
- Section 704 - Cement Concrete
- Section 705 - Joint Material
- Section 709 - Reinforcement Steel
- Section 711 - Concrete Admixtures and Curing Materials
- Section 714 - Precast Concrete Products
- Section 937 - Delineation Devices
- Section 1001 - Cement Concrete Structures
- Section 1103 - Traffic Signing and Marking
- Section 1105 - Fabricated Structural Steel

T.52.1.3 SUBMITTALS

A. Submit shop drawings and descriptive information for the concrete glare screen and delineators specified herein.

B. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

C. Certification. Submit certification that the following products conform to the specified requirements:

Precast Concrete Glare Screen
Barrier Mount Delineators

T.52.2 MATERIALS

PennDOT Publication 408/2016-5,

A. Class AA Cement Concrete--Section 704

B. Premolded Expansion Joint Filler--Section 705.1
C. Reinforcement, Epoxy Coated--Section 709.1, 709.3 or 709.4
D. Curing and Protecting Covers--Section 711.1
E. Joint Sealing Material--Sections 705.4(b) or (c)
F. Mortar--Section 1001.2(d)
G. Coarse Aggregate--Section 703.2
H. Subbase Material--Section 350.2
I. Precast Single Face Concrete Barrier--Section 714
J. Structural Steel (Plates for Joints)--Section 1105.02(a)2. Galvanized as specified in Section 1105.02(s) or coated as specified in Section 605.2(a).
K. Barrier Mount Delineators--Section 937.2(a)
L. Protective Coating for Concrete--Section 503.2

T.52.3 METHOD OF CONSTRUCTION

As shown on the PennDOT Standard Drawings (RC-57, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as follows:

T.52.3.1 GENERAL

A. Submit proposed standard design modifications to the Engineer for review and acceptance before starting work.

B. Fill surface blemishes larger than ½-inch with mortar, as directed.

C. Install barrier mount delineation devices, as directed and/or in accordance with the manufacturer's recommendations and Section 937.

D. Apply a protective coating to barriers as specified in Section 503.

E. Remove existing concrete median barrier at the appropriate time in the construction schedule. Dispose of the removed concrete median barrier off-site.

F. Construct transition from concrete glare screen to the split barriers (single face concrete glare screen and single face concrete barrier special) under the CSX overpass, and as indicated.

T.52.3.2 PRECAST METHOD

A. Place additional subbase material, as needed and as indicated.

B. Sawcut bituminous pavement, as needed to place concrete glare screen at the proper elevation.

C. Install barrier sections on bituminous surface or properly prepared subbase surface.

T.52.3.3 JOINTS

A. Form by hand or saw contraction joints 3/16-inch wide and 2 inches deep, at 20-foot intervals. Saw as soon as possible after the concrete has set sufficiently to preclude raveling during the sawing, before any shrinkage cracking occurs in the concrete. The depth of saw cut may be decreased at the edge adjacent to the pavement to obtain a maximum depth without pavement damage.

B. Tool construction joint edges.

C. Place 3/4-inch premolded, expansion-joint material, cut to conform to the cross sectional area, at structures and at the end of the work day.

D. Construct longitudinal joint a maximum of 1/4-inch wide on both sides of the barrier, as indicated. On curved sections, a maximum ½-inch longitudinal joint will be permitted. For curves greater than 2 degrees 30 minutes, use shorter precast barrier lengths to maintain longitudinal joint tolerances.

E. Seal joints, as specified in PennDOT Publication 408/2016-5, Section 501.

T.52.3.4 Removal of Forms. Do not remove forms until at least 12 hours after the concrete has been placed. Rubbing to correct irregularities will not be permitted until the full curing period has elapsed. Correct any irregular surface by rubbing with a carborundum stone. Brush finishing or plastering will not be permitted. After removing the forms, fill minor defects with mortar. Promptly remove and replace rejected barrier.

T.52.3.5 Have the finished barrier conform to the dimensions of the design template within 1/4-inch in all directions and across the joints. Test the top and side surfaces using a 10-foot straightedge. Hold the straightedge in successive positions for the entire length of the barrier and advance in stages of not more than 5 feet. Remove and replace barrier with deviations in excess of 1/4-inch as measured from the testing edge of the straightedge.

END OF SECTION

SECTION T.53 50” ASYMMETRICAL CONCRETE GLARE SCREEN

T.53.1 GENERAL

T.53.1.1 DESCRIPTION

This work is construction of asymmetrical concrete glare screen, including all materials, delineators, and associated hardware.

T.53.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Publication 408/2016-5
Section 350 - Subbase
Section 503 - Protective Coating for Cement Concrete Pavement
Section 703 - Aggregates
Section 704 - Cement Concrete
Section 705 - Joint Material
Section 709 - Reinforcement Steel
Section 711 - Concrete Admixtures and Curing Materials
Section 714 - Precast Concrete Products
Section 937 - Delineation Devices
Section 1001 - Cement Concrete Structures
Section 1103 - Traffic Signing and Marking
Section 1105 - Fabricated Structural Steel

T.53.1.3 SUBMITTALS

A. Submit shop drawings and descriptive information for the concrete glare screen and delineators specified herein.

B. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

C. Certification. Submit certification that the following products conform to the specified requirements.

Precast Asymmetrical Concrete Glare Screen
Barrier Mount Delineators

T.53.2 MATERIALS

PennDOT Publication 408/2016-5,
A. Class AA Cement Concrete--Section 704

B. Premolded Expansion Joint Filler--Section 705.1
C. Reinforcement, Epoxy Coated--Section 709.1, 709.3 or 709.4
D. Curing and Protecting Covers--Section 711.1
E. Joint Sealing Material--Sections 705.4(b) or (c)
F. Mortar--Section 1001.2(d)
G. Coarse Aggregate--Section 703.2
H. Subbase Material--Section 350.2
I. Precast Single Face Concrete Barrier--Section 714
J. Structural Steel (Plates for Joints)--Section 1105.02(a)2. Galvanized as specified in Section 1105.02(s) or coated as specified in Section 605.2(a).
K. Barrier Mount Delineators--Section 937.2(a)
L. Protective Coating for Concrete--Section 503.2

T.53.3 METHOD OF CONSTRUCTION

As shown on the PennDOT Standard Drawings (RC-57, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as follows:

T.53.3.1 GENERAL

A. Submit proposed standard design modifications to the Engineer for review and acceptance before starting work.

B. Fill surface blemishes larger than ½-inch with mortar, as directed.

C. Install barrier mount delineation devices, as directed and/or in accordance with the manufacturer's recommendations and Section 937.

D. Apply a protective coating to barriers as specified in Section 503.

E. Remove existing concrete median barrier at the appropriate time in the construction schedule. Dispose of the removed concrete median barrier off-site.

F. Construct transitions to and from asymmetrical concrete glare screen as indicated.

T.53.3.2 PRECAST METHOD

A. Place additional subbase material, as needed and as indicated.

B. Sawcut and/or excavate bituminous pavement, as needed to place concrete glare screen at the proper elevation.

C. Install barrier sections on bituminous surface or properly prepared subbase/subgrade surface.

D. Backfill with suitable material, as needed to proposed roadway subbase elevation.

T.53.3.3 JOINTS

A. Form by hand or saw contraction joints 3/16-inch wide and 2 inches deep, at 20-foot intervals. Saw as soon as possible after the concrete has set sufficiently to prelude raveling during the sawing, before any shrinkage cracking occurs in the concrete. The depth of saw cut may be decreased at the edge adjacent to the pavement to obtain a maximum depth without pavement damage.

B. Tool construction joint edges.

C. Place 3/4-inch premolded, expansion-joint material, cut to conform to the cross sectional area, at structures and at the end of the work day.

D. Construct longitudinal joint a maximum of 1/4-inch wide on both sides of the barrier, as indicated. On curved sections, a maximum ½-inch longitudinal joint will be permitted. For curves greater than 2 degrees 30 minutes, use shorter precast barrier lengths to maintain longitudinal joint tolerances.

E. Seal joints, as specified in PennDOT Publication 408/2016-5, Section 501.

T.53.3.4 Removal of Forms. Do not remove forms until at least 12 hours after the concrete has been placed. Rubbing to correct irregularities will not be permitted until the full curing period has elapsed. Correct any irregular surface by rubbing with a carborundum stone. Brush finishing or plastering will not be permitted. After removing the forms, fill minor defects with mortar. Promptly remove and replace rejected barrier.

T.53.3.5 Have the finished barrier conform to the dimensions of the design template within 1/4-inch in all directions and across the joints. Test the top and side surfaces using a 10-foot straightedge. Hold the straightedge in successive positions for the entire length of the barrier and advance in stages of not more than 5 feet. Remove and replace barrier with deviations in excess of 1/4-inch as measured from the testing edge of the straightedge.

END OF SECTION

SECTION T.54 TRANSITION FROM EXISTING CONCRETE GLARE SCREEN TO 50” CONCRETE GLARE SCREEN

T.54.1 GENERAL

T.54.1.1 DESCRIPTION

This work is construction of concrete glare screen transitions from existing to proposed, including all materials, delineators, and associated hardware.

T.54.1.2 QUALITY ASSURANCE

Refer to Section T.52.1.2.

T.54.1.3 SUBMITTALS

Refer to Section T.52.1.3.

T.54.2 MATERIALS

Refer to Section T.52.2.

T.54.3 METHOD OF CONSTRUCTION

As shown on the PennDOT Standard Drawings (RC-57, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.52.3.

END OF SECTION

SECTION T.55 NOT USED

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SECTION T.56 TRANSITION FROM 50" CONCRETE GLARE SCREEN TO ASYMMETRICAL CONCRETE GLARE SCREEN

T.56.1 GENERAL

T.56.1.1 DESCRIPTION

This work is construction of concrete glare screen transitions from 50" Concrete Glare Screen to Asymmetrical Concrete Glare Screen, including all materials, delineators, and associated hardware.

T.56.1.2 QUALITY ASSURANCE

Refer to Section T.52.1.2 and T.53.1.2.

T.56.1.3 SUBMITTALS

Refer to Section T.52.1.3 and T.53.1.3.

T.56.2 MATERIALS

Refer to Section T.52.2 and T.53.2.

T.56.3 METHOD OF CONSTRUCTION

As shown on the Standard Drawings (RC-50, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.52.3 and T.53.3.

END OF SECTION

SECTION T.57 TRANSITION FROM 50” CONCRETE GLARE SCREEN TO CONCRETE MEDIAN BARRIER

T.57.1 GENERAL

T.57.1.1 DESCRIPTION

This work is construction of concrete transitions from 50” Concrete Glare Screen to Concrete Median Barrier, including all materials, delineators, and associated hardware.

T.57.1.2 QUALITY ASSURANCE

Refer to Section T.52.1.2 and T.60.1.2.

T.57.1.3 SUBMITTALS

Refer to Section T.52.1.3 and T.60.1.3.

T.57.2 MATERIALS

Refer to Section T.52.2 and T.60.2.

T.57.3 METHOD OF CONSTRUCTION

As shown on the Standard Drawings (RC-57, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.52.3 and T.60.3.

END OF SECTION

SECTION T.58 TRANSITION FROM EXISTING CONCRETE GLARE SCREEN TO ASYMMETRICAL CONCRETE GLARE SCREEN

T.58.1 GENERAL

T.58.1.1 DESCRIPTION

This work is construction of concrete glare screen transitions from existing to asymmetrical, including all materials, delineators, and associated hardware.

T.58.1.2 QUALITY ASSURANCE

Refer to Section T.52.1.2.

T.58.1.3 SUBMITTALS

Refer to Section T.52.1.3.

T.58.2 MATERIALS

Refer to Section T.52.2.

T.58.3 METHOD OF CONSTRUCTION

As shown on the Standard Drawings (RC-50, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.52.3.

END OF SECTION

SECTION T.59 TRANSITION FROM ASYMMETRICAL CONCRETE GLARE SCREEN TO DUAL SINGLE FACED BARRIER

T.59.1 GENERAL

T.59.1.1 DESCRIPTION

This work is construction of concrete transitions from Asymmetrical Concrete Glare Screen to Dual Single Faced Barrier, including all materials, delineators, and associated hardware.

T.59.1.2 QUALITY ASSURANCE

Refer to Section T.53.1.2 and T.62.1.2.

T.59.1.3 SUBMITTALS

Refer to Section T.53.1.3 and T.62.1.3.

T.59.2 MATERIALS

Refer to Section T.53.2 and T.62.2.

T.59.3 METHOD OF CONSTRUCTION

As shown on the Standard Drawings (RC-58, RC-59, and TC-8604) and Construction Detail Plans, as specified in the applicable parts of PennDOT Publication 408/2016-5, Section 1001.3, and as listed in T.53.3 and T.62.3.

END OF SECTION

SECTION T.60 CONCRETE MEDIAN BARRIER

T.60.1 GENERAL

T.60.1.1 DESCRIPTION

This work is the construction of cement concrete median barrier, including all materials, delineators, and associated hardware.

T.60.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 623 and Section 937.

T.60.2 MATERIALS

T.60.2.1 In accordance with PennDOT Publication 408/2016-5, Section 623.2 and Section 937.2.

T.60.3 METHOD OF CONSTRUCTION

T.60.3.1 In accordance with PennDOT Publication 408/2016-5, Section 623.3, Section 937.3, and Section 1001.3, as shown on PennDOT Standard Drawings (RC-50, RC-57, and TC-8604), and the Construction Detail Plans.

END OF SECTION

SECTION T.61 END TRANSITION, CONCRETE MEDIAN BARRIER

T.61.1 GENERAL

T.61.1.1 DESCRIPTION

This work is the construction of cement concrete median barrier end transitions, including all materials, delineators, and associated hardware.

T.61.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 623 and Section 937.

T.61.2 MATERIALS

T.61.2.1 In accordance with PennDOT Publication 408/2016-5, Section 623.2 and Section 937.2.

T.61.3 METHOD OF CONSTRUCTION

T.61.3.1 In accordance with PennDOT Publication 408/2016-5, Section 623.3, Section 937.3, and Section 1001.3, as shown on PennDOT Standard Drawings (RC-50, RC-57, and TC-8604), and the Construction Detail Plans.

END OF SECTION

SECTION T.62 SINGLE FACE CONCRETE BARRIER

T.62.1 GENERAL

T.62.1.1 DESCRIPTION

This work is the construction of cement concrete single face barrier, including all materials, delineators, and associated hardware.

T.62.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 623 and Section 937.

T.62.2 MATERIALS

T.62.2.1 In accordance with PennDOT Publication 408/2016-5, Section 623.2 and Section 937.2.

T.62.3 METHOD OF CONSTRUCTION

T.62.3.1 In accordance with PennDOT Publication 408/2016-5, Section 623.3, Section 937.3, and Section 1001.3, as shown on PennDOT Standard Drawings (RC-50, RC-58, and TC-8604), and the Construction Detail Plans.

END OF SECTION

SECTION T.63 END TRANSITION, SINGLE FACE CONCRETE BARRIER

T.63.1 GENERAL

T.63.1.1 DESCRIPTION

This work is the construction of cement concrete single face barrier end transitions, including all materials, delineators, and associated hardware.

T.63.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 623 and Section 937.

T.63.2 MATERIALS

T.63.2.1 In accordance with PennDOT Publication 408/2016-5, Section 623.2 and Section 937.2.

T.63.3 METHOD OF CONSTRUCTION

T.63.3.1 In accordance with PennDOT Publication 408/2016-5, Section 623.3, Section 937.3, and Section 1001.3, as shown on PennDOT Standard Drawings (RC-50, RC-58, and TC-8604), and the Construction Detail Plans.

END OF SECTION

SECTION T.64 MODIFIED RETAINED FILL BARRIER

T.64.1 GENERAL

T.64.1.1 DESCRIPTION

This work is the construction of cement concrete modified retained fill barrier, including all materials, delineators, and associated hardware.

T.64.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 623 and Section 937.

T.64.2 MATERIALS

T.64.2.1 In accordance with PennDOT Publication 408/2016-5, Section 623.2 and Section 937.2.

T.64.3 METHOD OF CONSTRUCTION

T.64.3.1 In accordance with PennDOT Publication 408/2016-5, Section 623.3, Section 937.3, and Section 1001.3, as shown on PennDOT Standard Drawings (RC-50, RC-58, and TC-8604), and the Construction Detail Plans.

END OF SECTION

SECTION T.65 PADDLE GLARE SCREEN

T.65.1 GENERAL

T.65.1.1 DESCRIPTION

This work is the furnishing and installing of glare screen base plates and glare screen blades for existing modular glare screen systems.

T.65.2 MATERIALS

T.65.2.1 Glare screen base plate and glare screen blades matching the existing Carsonite modular glare screen system as manufactured by Carsonite International, 2900 Lockheed Way, Carson City, Nevada 89701, Phone: (702) 883-5104 or (800) 648-7974, or from a manufacturer listed in Bulletin 15. Includes all necessary anchor hardware.

T.65.3 METHOD OF CONSTRUCTION

T.65.3.1 Remove and dispose of damaged materials as directed. Install new materials in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION T.66 MODIFIED RETAINED FILL BARRIER TRANSITION

T.66.1 GENERAL

T.66.1.1 DESCRIPTION

This work is the construction of cement concrete modified retained fill barrier end transitions, including all materials, delineators, and associated hardware.

T.66.1.2 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 623 and Section 937.

T.66.2 MATERIALS

T.66.2.1 In accordance with PennDOT Publication 408/2016-5, Section 623.2 and Section 937.2.

T.66.3 METHOD OF CONSTRUCTION

T.66.3.1 In accordance with PennDOT Publication 408/2016-5, Section 623.3, Section 937, and Section 1001.3, as shown on PennDOT Standard Drawings (RC-50, RC-58, and TC-8604), and the Construction Detail Plans.

END OF SECTION

SECTION T.67-74 NOT USED

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SECTION T.75 RIGHT-OF-WAY FENCE, TYPE 1

T.75.1 GENERAL

T.75.1.1 DESCRIPTION

This work is the removal of existing right-of-way fence and the construction of new right-of-way fence of the type indicated and at locations as indicated and/or directed. This work also includes the temporary removal and replacement of existing fence sections and poles, as indicated and/or directed.

T.75.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Publication 408/2016-5
- Section 704 - Cement Concrete
- Section 1110 - Right-of-Way Fence
- Section 1001 - Cement Concrete Structures

ASTM Standards
- ASTM C387 - Packaged, Dry Combined Materials for Mortar and Concrete

T.75.1.3 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit certification that the following products conform to the specified requirements:

Fence Fabric
Fence Posts
End Posts
Pull Posts
Line Posts
Vehicle Gates

T.75.2 MATERIALS

A. Right-of-Way Fence-- PennDOT Publication 408/2016-5, Section 1110.

B. Packaged Dry Cement--ASTM C387 for Packaged, Dry Combined Materials for Mortar and Concrete, Normal Strength Concrete; Type IA, IP-A, IIA, or IIIA cement; 28-day compressive strength of 3,000 psi.

C. Other Material.

(1) Class A Cement Concrete -- PennDOT Publication 408/2016-5, Section 704

(2) Ground Rod. Acceptable 1-inch x 10-foot copperclad rod with suitable clamps.

(3) Ground Wire: No. 4 AWG Solid Copper

T.75.3 METHOD OF CONSTRUCTION

As shown on PennDOT Standard Drawings (RC-60 & RC-61) and as follows:

A. General. Remove existing right-of-way fence at locations as indicated or as directed by the Engineer. Dispose of existing right-of-way fence fabric, posts, hardware and foundations off-site. All proposed right-of-way fence is to be constructed at the same locations as existing except between Sta. 56+00 to Sta. 62+50 Eastbound where it is to be slightly relocated as indicated on the Contract Drawings.

Clear and grub, as necessary, to construct the right-of-way fence and to provide a reasonably smooth ground profile at the fence line, unless otherwise directed. Cut, trim, and remove vegetation, as specified in Section T.10, as required for right-of-way fence installation.

Excavate and compact embankment a maximum depth of 6 inches and a minimum width of 18 inches, with 1:2 side slopes, unless otherwise directed to obtain the desired elevations. Fill minor ground depressions that are not normally water courses.

Restore areas disturbed by grading operations, as specified in Section T.111.

When required, join new and existing right-of-way fence, as indicated or directed.

Complete the fence substantially true to line, plumb, taut, rigid, and erected in conformance with established practices for the type specified.

B. Posts. Orient posts with sections that have a major and a minor bending axis, with the major axis parallel to the fence line. Place corner posts with the major axis parallel to one of the lines of the fence.

Drive line posts, except when concrete footings are required. Obtain acceptance for the method of driving and of protecting the post. Remove and replace posts with battered heads or posts bent or otherwise damaged to the

extent that their serviceability or appearance is significantly affected, as directed.

Where indicated, furnish and place longer line posts to suit field conditions.

Where rock is encountered, drill a hole having a diameter 1/2-inch larger than the post's maximum dimension, at least 12 inches into the rock, then grout the post in place with mortar.

C. Anchorages. Construct concrete footings or install acceptable drive anchors. Construct concrete footings, using Class A Concrete or packaged dry concrete. Concrete footings will not require forming. Finish the footing tops to drain water away from the posts. Do not place the fabric until the concrete has cured for a minimum of 72 hours.

D. Fabric. Firmly fasten wire fabric to the posts using aluminum or galvanized bands or clamps, or by another acceptable method.

Splice fabric by the use of an acceptable method that develops the full fabric strength.

Normally, place fabric on the side of the fence toward the highway. At corner posts and on curves, place the fabric so it pulls against the post.

When supplied with both knuckled and barbed selvages, install fabric with the barbed selvage on the fence top edge.

E. Gates. Install gates where indicated or directed.

F. Electrical Grounds. Install an electrical ground directly under areas where electrical transmission, distribution, or secondary lines cross over the right-of-way fence. Drive a 10-foot copperclad rod, a minimum of one-inch in diameter, vertically until the top is approximately 6 inches below the ground elevation. Clamp a No. 4 AWG solid-copper conductor to the rod and to the fence so each fence element is grounded.

END OF SECTION

SECTION T.76 VEHICULAR GATE FOR TYPE 1 RIGHT-OF-WAY FENCE

T.76.1 GENERAL

Conform to requirements of Section T.75.

END OF SECTION

SECTION T.77-91 NOT USED

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SECTION T.92 TYPE 31-S GUIDE RAIL

T.92.1 GENERAL

T.92.1.1 DESCRIPTION

This work is construction of new guide rail of the type indicated, including all appurtenances, delineators, and hardware.

T.92.1.2 QUALITY ASSURANCE

Conform to the following:

PennDOT Publication 408/2016-5
Section 1109 - Guide Rail and Metal Median Barrier
Section 1103 - Traffic Signing and Marking
Section 937 - Delineation Devices

T.92.1.3 SUBMITTALS

A. Submit shop drawings and descriptive information for the guide rail, posts, and delineators specified herein.

B. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

C. Certification. Submit certification that the following products conform to the specified requirements:

Guide Rail and Posts
Guide Rail Mount Delineators

T.92.2 MATERIAL

A. Guide Rail - Section 1109

B. Delineation Devices. Polycarbonate, butterfly-shaped models that fit in the web of the guide rail and attach with the guide rail attaching bolts.

T.92.3 METHOD OF CONSTRUCTION

T.92.3.1 General. As shown on PennDOT Standard Drawings (RC-50, RC-51, and TC-8604) and as follows:

T.92.3.1 New Guide Rail

T.92.3.1.1 General. Set posts plumb, at the spacing shown. Minor adjustments in spacing may be permitted to clear objects or to fit between fixed ends.

Use bolts that are long enough to extend at least 1/4-inch beyond the nuts. Draw bolts tight, except where otherwise required for expansion.

Prior to installation, apply acceptable galvanizing paint to repair portions of posts to be placed underground. After installation, apply two coats of the galvanizing paint to guide rail or related appurtenances, including threaded portions of fittings, fasteners, and the cut end of bolts, that have been abraded or cut, exposing the base metal.

When guide rail is installed under traffic conditions, comply with the following requirements:

A. Perform work only within those areas protected by temporary traffic control devices.

B. Attach guide rail on posts driven during the day, before the end of that day.

C. Provide satisfactory protection at exposed, unfinished ends of guide rail.

Join new and existing guide rail, when required, as indicated or directed.

Install one-sided guide rail mount delineation devices, as directed and/or in accordance with the manufacturer's recommendations.

T.92.3.1.2 Posts and Offset Brackets. Drill or punch holes suitable to the type of guide rail indicated. Drive posts mechanically, unless otherwise directed. Do not batter, burr, separate galvanizing from steel, or distort the post. As directed, remove and replace posts bent or otherwise damaged. Install offset brackets, when required.

T.92.3.1.3 Rail Elements. Do not allow the free end of rail elements to swing free and cantilever from the 5/16-inch mounting bolt. Rest the free end on temporary ½-inch support bolts and nuts or temporary drift pins until the 5/16-inch mounting bolts are torqued.

Splice by lapping in the direction of traffic. Provide full contact between the rail elements in the overlap, between the center and both edges of the element, and between the bracket or post, as the case may be.

Use suitable shop-formed guide rail or rubbing rails on curves having a radius of less than 150 feet.

END OF SECTION

SECTION T.93 TYPE 31-SC GUIDE RAIL

T.93.1 GENERAL

Conform to requirements of Section T.92.

END OF SECTION

SECTION T.94 TYPE 31-SCC GUIDE RAIL

T.94.1 GENERAL

Conform to requirements of Section T.92.

END OF SECTION

SECTION T.95 REMOVAL OF EXISTING GUIDE RAIL (CONTRACTOR'S PROPERTY)

T.95.1 GENERAL

T.95.1.1 DESCRIPTION

This work is the removal of existing guide rail. Dispose of all guide rail off-site except for all aluminum rails which are to be delivered to the DRPA Maintenance Yard by the Contractor.

T.95.2 MATERIALS

None

T.95.3 METHOD OF CONSTRUCTION

Remove existing guide rail from locations indicated, then dispose of all the material except the aluminum rails outside the right-of-way. Deliver the aluminum rails to the DRPA Maintenance Yard.

END OF SECTION

SECTION T.96-97 NOT USED

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SECTION T.98 TYPE 31 STRONG POST ANCHOR TERMINAL

T.98.1 GENERAL

T. 98.1.1 DESCRIPTION

This work is furnishing and installing of type 31 strong post anchor terminal, including all appurtenances and hardware, as specified herein and as indicated.

T. 98.1.2 STANDARDS

PennDOT Standard Drawings RC-50, RC-51, and RC-54
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Publication 13M, Design Manual 2, Chapter 12
AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016

T. 98.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 620.

T. 98.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 620.

T. 98.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.98.2 MATERIALS

T. 98.2.1 In accordance with PennDOT Publication 408/2016-5, Section 620.2, and as follows.

Contractor to obtain approval from Engineer prior to ordering any anchor terminals.

T.98.3 METHOD OF CONSTRUCTION

T. 98.3.1 In accordance with PennDOT Publication 408/2016-5, Section 620.3.

END OF SECTION

SECTION T.99 TERMINAL SECTION, SINGLE

T.99.1 GENERAL

T.99.1.1 DESCRIPTION

This work is furnishing and installing of terminal section, single, including all appurtenances and hardware, as specified herein and as indicated.

T.99.1.2 STANDARDS

PennDOT Standard Drawings RC-50, RC-51, and RC-54
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Publication 13M, Design Manual 2, Chapter 12
AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016

T.99.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.99.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.99.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.99.2 MATERIALS

T.99.2.1 In accordance with PennDOT Publication 408/2016-5, Section 620.2, and as follows.

Contractor to obtain approval from Engineer prior to ordering any terminal sections.

T.99.3 METHOD OF CONSTRUCTION

T.99.3.1 In accordance with PennDOT Publication 408/2016-5, Section 620.3.

END OF SECTION

SECTION T.100 TERMINAL SECTION, BRIDGE CONNECTION

T.100.1 GENERAL

T.100.1.1 DESCRIPTION

This work is furnishing and installing of terminal section, bridge connection, including all appurtenances and hardware, as specified herein and as indicated.

T.100.1.2 STANDARDS

PennDOT Standard Drawings RC-50, RC-51, and RC-54
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Publication 13M, Design Manual 2, Chapter 12
AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016

T.100.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.100.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.100.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.100.2 MATERIALS

T.100.2.1 In accordance with PennDOT Publication 408/2016-5, Section 620.2, and as follows.

Contractor to obtain approval from Engineer prior to ordering any terminal sections.

T.100.3 METHOD OF CONSTRUCTION

T.100.3.1 In accordance with PennDOT Publication 408/2016-5, Section 620.3.

END OF SECTION

SECTION T.101 TYPICAL AND ALTERNATE CONCRETE BRIDGE BARRIER TRANSITION WITHOUT INLET PLACEMENT

T.101.1 GENERAL

T.101.1.1 DESCRIPTION

This work is furnishing and installing of typical and alternate concrete bridge barrier transition without inlet placement, including all appurtenances and hardware, as specified herein and as indicated.

T.101.1.2 STANDARDS

PennDOT Standard Drawings RC-50, RC-51, and RC-54
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Publication 13M, Design Manual 2, Chapter 12
AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016

T.101.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.101.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.101.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.101.2 MATERIALS

T.101.2.1 In accordance with PennDOT Publication 408/2016-5, Section 620.2, and as follows.

Contractor to obtain approval from Engineer prior to ordering any transitions.

T.101.3 METHOD OF CONSTRUCTION

T.101.3.1 In accordance with PennDOT Publication 408/2016-5, Section 620.3.

END OF SECTION

SECTION T.102 THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION

T.102.1 GENERAL

T.102.1.1 DESCRIPTION

This work is furnishing and installing of thrie-beam to vertical wall bridge barrier transition, including all appurtenances and hardware, as specified herein and as indicated. Work also includes modifications to bridge barriers and concrete barriers, as indicated and as specified.

T.102.1.2 STANDARDS

PennDOT Standard Drawings RC-50, RC-51, and RC-54
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Publication 13M, Design Manual 2, Chapter 12
AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016

T.102.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.102.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.102.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 620.

T.102.2 MATERIALS

T.102.2.1 In accordance with PennDOT Publication 408/2016-5, Section 620.2, and as follows.

Contractor to obtain approval from Engineer prior to ordering any transitions.

T.102.3 METHOD OF CONSTRUCTION

T.102.3.1 In accordance with PennDOT Publication 408/2016-5, Section 620.3.

END OF SECTION

SECTION T.103 PERMANENT IMPACT ATTENUATING DEVICE, TYPE V (REUSABLE), TEST LEVEL 3

T.103.1 GENERAL

T.103.1.1 DESCRIPTION

This work is furnishing and installing of permanent impact attenuating devices, including all appurtenances and hardware, as specified herein and as indicated.

T.103.1.2 STANDARDS

AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016
PennDOT Publication 13M, Design Manual 2, Chapter 12
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Standard Drawings RC-50, RC-51, and RC-54

T.103.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 619.

T.103.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 619, and as follows.

Device shall be compliant with MASH 2016 standards for impact attenuating devices.

T.103.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 619.

T.103.2 MATERIALS

T.103.2.1 In accordance with PennDOT Publication 408/2016-5, Section 619.2, and as follows.

Item installed shall be "QuadGuard Elite" as manufactured by Energy Absorption Systems, or Authority Approved Equal. Contractor to obtain approval from Engineer prior to ordering any devices.

T.103.3 METHOD OF CONSTRUCTION

T.103.3.1 In accordance with PennDOT Publication 408/2016-5, Section 619.3 and in accordance with manufacturer's recommended installation procedures and specifications.

END OF SECTION

SECTION T.104 PERMANENT IMPACT ATTENUATING DEVICE, TYPE II, TEST LEVEL 3 (ENERGY ABSORBING TERMINALS TANGENT)

T.104.1 GENERAL

T.104.1.1 DESCRIPTION

This work is furnishing and installing of permanent impact attenuating devices, including all appurtenances and hardware, as specified herein and as indicated.

T.104.1.2 STANDARDS

AASHTO Manual for Assessing Safety Hardware (MASH), 2nd Edition, 2016
PennDOT Publication 13M, Design Manual 2, Chapter 12
PennDOT Publication 35, Approved Construction Materials (Bulletin 15)
PennDOT Standard Drawings RC-50, RC-51, and RC-54

T.104.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 619.

T.104.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 619.

Device shall be compliant with MASH 2016 standards for impact attenuating devices.

T.104.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 619.

T.104.2 MATERIALS

T.104.2.1 In accordance with PennDOT Publication 408/2016-5, Section 619.2, and as follows.

Contractor to obtain approval from Engineer prior to ordering any devices.

T.104.3 METHOD OF CONSTRUCTION

T.104.3.1 In accordance with PennDOT Publication 408/2016-5, Section 619.3 and in accordance with manufacturer's recommended installation procedures and specifications.

END OF SECTION

SECTION T.105-115 NOT USED

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SECTION T.116 6” YELLOW WATERBORNE PAVEMENT MARKINGS

T.116.1 GENERAL

T.116.1.1 DESCRIPTION

This work is the furnishing and application of waterborne pavement markings, of the type and color indicated.

T.116.1.2 STANDARDS

PennDOT Standard Drawings TC-8600, TC-8602, and TC-8604

T.116.1.3 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 962.

T.116.1.4 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 962.

T.116.1.5 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 962.

T.116.2 MATERIALS

T.116.2.1 In accordance with PennDOT Publication 408/2016-5, Section 962.2.

T.116.3 METHOD OF CONSTRUCTION

T.116.3.1 In accordance with PennDOT Publication 408/2016-5, Section 962.3.

END OF SECTION

SECTION T.117 6” WHITE WATERBORNE PAVEMENT MARKINGS

T.117.1 GENERAL

Conform to requirements of Section T.116.

END OF SECTION

SECTION T.118 8” WHITE WATERBORNE PAVEMENT MARKINGS

T.118.1 GENERAL

Conform to requirements of Section T.116.

END OF SECTION

SECTION T.119 24” WHITE WATERBORNE PAVEMENT MARKINGS

T.119.1 GENERAL

Conform to requirements of Section T.116.

END OF SECTION

SECTION T.120 24” YELLOW WATERBORNE PAVEMENT MARKINGS

T.120.1 GENERAL

Conform to requirements of Section T.116.

END OF SECTION

SECTION T.121 SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR W/B

T.121.1 GENERAL

T.121.1.1 DESCRIPTION — This work is the furnishing, installation, replacement, and removal of snowplowable, retroreflective, raised pavement markers of the type indicated.

T.121.1.2 RELATED SECTIONS

In accordance with PennDOT Publication 408/2016-5, Section 966.

T.121.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.
   4. PennDOT Publication 111M (Traffic Control – Pavement Marking and Signing Standards) TC-8600, TC-8602, and TC-8604

T.121.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 966.

T.121.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 966.

T.121.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 966.

T.121.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 966.2.

T.121.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 966.3.

END OF SECTION

SECTION T.122 SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR W/R

T.121.1 GENERAL

Conform to requirements of Section T.121.

END OF SECTION

SECTION T.123 SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR Y/R

T.123.1 GENERAL

Conform to requirements of Section T.121.

END OF SECTION

SECTION T.124-130 NOT USED

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SECTION T.131 POST-MOUNTED SIGNS, TYPE A

T.131.1 GENERAL

T.131.1.1 DESCRIPTION: This work is furnishing and installing fabricated aluminum signs of the type indicated to steel S or W beam posts with breakaway system. The posts and/or breakaway systems are included in item T.132.

T.131.1.2 QUALITY ASSURANCE: All work shall conform to the following:

Reference Standards:

(1) PennDOT Publication 408/2016-5

Section 1103 - Traffic Signing and Marking

T.131.1.3 SUBMITTALS:

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for signs.

(2) Certification. Submit certification that the signs conform to the specified requirements:

T.131.2 MATERIALS:

(1) Extruded Aluminum Channel Signs - PennDOT Publication 408/2016-5, Section 1103.02

(2) Flat Sheet Aluminum Signs with Stiffeners - PennDOT Publication 408/2016-5, Section 1103.03

(3) Aluminum Hardware - PennDOT Publication 408/2016-5, Section 1103.11

T.131.3 METHOD OF CONSTRUCTION

T.131.3.1 GENERAL: Erect signs by a method that does not twist, bend, or otherwise deform the signs. Level and correctly align, then center signs on the posts and properly fasten. Exercise extreme care when using hoisting cables on the sign to avoid damage to the reflective sheeting. Repair or replace damaged signs.

T.131.3.2 LOCATION: The indicated location of sign installations is approximate with the exact location established at the site and approved by the Engineer. The longitudinal

and lateral location will be marked either by stakes, by paint marks with an identifying symbol, or as otherwise directed.

T.131.3.3 REMOVAL OF EXISTING SIGNS: Do not remove existing signs or sign installations, except when indicated or directed. When directed, remove the existing signs and deliver the signs to the Walt Whitman Bridge Maintenance Garage or to a location on DRPA property as specified by the Engineer. Dispose of all sign posts and hardware.

T.131.3.4 CLEARING AND GRUBBING: When directed, and as specified in Section T.5, remove material, brush, trees, or branches that obstruct the clear view of signs being placed.

T.131.3.5 RESTORATION OF SITE: Satisfactorily restore the site to its original condition, as directed, including the disposal of excess or unsuitable materials.

T.131.3.6 ERECTION: For extruded aluminum channels, install lock-nuts on post clips with a torque wrench. Apply 225 inch-pounds of torque to each aluminum lock-nut with the threads dry, clean and unlubricated.

For flat sheet aluminum, attach the sign to posts with either twist-in toggle and buckle straps or stainless steel post-clips. Apply 225 inch-pounds of torque to each stainless steel lock-nut with the threads dry, clean and unlubricated.

Thoroughly clean signs after erection, removing any accumulation of oil, grease, dirt or foreign material.

When exit panels cannot be supported by two sign posts, brace the panel with one or more auxiliary supports.

END OF SECTION

SECTION T.132 STEEL S OR W BEAM POSTS

T.132.1 GENERAL

T.132.1.1 DESCRIPTION: This work is furnishing and installing steel S or W beam posts for fabricated aluminum signs and breakaway system at the locations shown on the plans and as indicated on the Standard Drawings. The signs and breakaway systems are included in other payment items. The cement concrete and steel reinforcement required for the foundations shall be included in this item.

T.132.1.2 QUALITY ASSURANCE: All work shall conform to the following:

Reference Standards:

(1) PennDOT Publication 408/2016-5

Section 1103 - Traffic Signing and Marking

T.132.1.3 SUBMITTALS:

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for posts.

(2) Posts and Foundations. Prior to having posts fabricated, submit a sketch for each plan locations, showing the following:

- location of sign by plan station;
- lateral offset from pavement edge to sign edge;
- sign size (width and height);
- exit panel sign size(width and height);
- number of post supports and sections;
- post heights, measured from bottom of post base plate to post top;
- distance to footing top, measured from reference line elevation at pavement edge to footing top;
- footing base type design and reinforcing steel; and
- bracket identification number and quantity required.

(3) Certification. Submit certification that the posts conform to the specified requirements:

T.132.2 MATERIALS:

(1) Steel S or W Beam Posts - PennDOT Publication 408/2016-5, Section 1103.07

(2) Foundations

Class A Cement Concrete - PennDOT Publication 408/2016-5, Section 704

Reinforcing Bars - PennDOT Publication 408/2016-5, Section 709

T.132.3 METHOD OF CONSTRUCTION

T.132.3.1 GENERAL: Erect posts plumb using a method that does not twist, bend, or otherwise deform the posts. Before erection, correct twisted, bent, or deformed posts. Repair or replace damaged posts.

T.132.3.2 LOCATION: The indicated location of sign installations is approximate with the exact location established at the site and approved by the Engineer. The longitudinal and lateral location will be marked either by stakes, by paint marks with an identifying symbol, or as otherwise directed.

On tangents, locate and erect the posts to allow signs to face toward the roadway at an angle of 85 degrees from the pavement edge, except face large guide signs with Class II reflective sheeting backgrounds away from the roadway at an angle not 93 degrees from the pavement edge. On curves, locate and erect the posts perpendicular to the sight line, where the sight line is an imaginary line connecting the center of the near traffic lane. The length in feet from the sign to the point is equal to 50 times the letter height of the smallest legend, but not less than 300 feet. Example: 50x12-inch letter equals a 600-foot sight line.

T.132.3.3 REMOVAL OF EXISTING SIGNS: Do not remove existing signs or sign installations, except when indicated or directed. When directed, remove the existing posts and dispose of off-site.

T.132.3.4 POSTS AND FOUNDATIONS: Excavate for the foundation, then position the posts and connections with the post flange faces aligned in the same plane. Place concrete against undisturbed earth, as specified in the applicable parts of Section T.186. Form the top one foot of foundations.

For parts or members, on which galvanizing has been damaged in transition or erection, replace with acceptable new material having properly galvanized surfaces. Minor damages to galvanized surfaces may be repaired by painting with two coats of Zinc Dust-Zinc Oxide Paint in accordance with ASTM-A 780, or with an acceptable equal.

T.132.3.5 RESTORATION OF SITE: Satisfactorily restore the site to its original condition, as directed, including the disposal of excess or unsuitable materials.

END OF SECTION

SECTION T.133 POST-MOUNTED SIGNS, TYPE B

T.133.1 GENERAL

T.133.1.1 DESCRIPTION: This work is furnishing and installing flat sheet signs on breakaway steel posts. The posts and breakaway systems are included in this item.

T.133.1.2 QUALITY ASSURANCE: All work shall conform to the following:

Reference Standards:

(1) PennDOT Publication 408/2016-5

Section 1103 - Traffic Signing and Marking

T.133.1.3 SUBMITTALS:

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for signs.

(2) Certification. Submit certification that the signs conform to the specified requirements:

T.133.2 MATERIALS:

(1) Flat Sheet Signs - PennDOT Publication 408/2016-5, Section 1103.04

(2) Breakaway Steel Posts - PennDOT Publication 408/2016-5, Section 1103.08

(3) Hardware - PennDOT Publication 408/2016-5, Section 1103.11

(4) Class A Cement Concrete - PennDOT Publication 408/2016-5, Section 704

T.133.3 METHOD OF CONSTRUCTION

T.133.3.1 As shown on PennDOT Standard Drawings, as specified in Section T.131 and as follows:

T.133.3.2 ANCHORAGE:

(1) Drive anchors into undisturbed earth to required depth.

(2) When posts are to be located in existing concrete areas such as divisors or islands, carefully drill the concrete as required.

(3) When steel channel bar posts are used in concrete, use socket system anchor with "V" of socket toward oncoming traffic and with socket set flush with original elevation. Concrete socket in place. Complete installation after concrete is cured a minimum of 72 hours.

(4) When square steel posts are used in concrete, either drive square anchor into undisturbed earth and cement in place, or use socket system anchor with "V" of socket angled at 45 degrees to oncoming traffic and with socket set flush with original elevation. Complete installation after concrete is cured a minimum of 72 hours.

T.133.3.3 ERECTION:

(1) Fasten STOP and YIELD signs, and other signs if indicated, to posts with anti-theft nuts and steel bolts.

(2) Permanently scribe one-inch numerals on back of sign indicating the month and year of installation.

END OF SECTION

SECTION T.134 POST-MOUNTED SIGNS, TYPE F

T.134.1 GENERAL

T.134.1.1 DESCRIPTION: This work is furnishing and installing flat sheet signs on either existing posts or posts installed for other purposes.

T.134.1.2 QUALITY ASSURANCE: All work shall conform to the following:

Reference Standards:

(1) PennDOT Publication 408/2016-5

Section 1103 - Traffic Signing and Marking

T.134.1.3 SUBMITTALS:

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for signs.

(2) Certification. Submit certification that the signs conform to the specified requirements:

T.134.2 MATERIALS:

(1) Flat Sheet Signs - PennDOT Publication 408/2016-5, Section 1103.04

(2) Hardware - PennDOT Publication 408/2016-5, Section 1103.11

T.134.3 METHOD OF CONSTRUCTION

T.134.3.1 As shown on PennDOT Standard Drawings, and as follows:

T.134.3.2 ATTACHMENT:

(1) Attach signs to supports as appropriate.

(2) Band signs or brackets to signal poles, mast arm columns, or luminaire supports.

(3) When mounting as a secondary sign below another sign, install the sign at a minimum height of 5 feet on the Walt Whitman Bridge Corridor; and at 6 feet on residential streets. Install route markers, regulatory signs, and warning signs at a height of at least 6 feet. The height is the difference in elevation between the near roadway edge surface and the sign bottom.

(4) Erect the sign in a level position, correctly aligned on the posts, and firmly attached with the necessary mounting hardware.

(5) Permanently scribe one-inch numerals on back of sign indicating the month and year of installation.

END OF SECTION

SECTION T.135 STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS

T.135.1 GENERAL

T.135.1.1 DESCRIPTION: This work is furnishing and installing fabricated aluminum signs of the type indicated for structure mounted signs.

T.135.1.2 QUALITY ASSURANCE: All work shall conform to the following:

Reference Standards:

(1) PennDOT Publication 408/2016-5

Section 1103 - Traffic Signing and Marking

Section 1105 - Fabricated Structural Steel

T.135.1.3 SUBMITTALS:

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for signs.

(2) Certification. Submit certification that the signs conform to the specified requirements:

T.135.2 MATERIALS:

(1) Extruded Aluminum Channel Signs - PennDOT Publication 408/2016-5, Section 1103.02

(2) Flat Sheet Aluminum Signs with Stiffeners - PennDOT Publication 408/2016-5, Section 1103.03

(3) Aluminum Hardware - PennDOT Publication 408/2016-5, Section 1103.11

(4) Other Miscellaneous Material:

Aluminum Angles - ASTM-B308, Alloy 6061-T6
Galvanized Steel Angles - ASTM A-36 Carbon Steel, galvanized in accordance with PennDOT Publication 408/2016-5, Section 1105.02(s)

T.135.3 METHOD OF CONSTRUCTION

T.135.3.1 GENERAL: As shown on PennDOT Standard Drawings and as follows:

Erect signs level, position correctly on sign brackets, and attach firmly with the necessary mounting hardware.

Erect signs by a method that does not twist, bend, or otherwise deform the signs. Level and correctly align, then center signs on the brackets and properly fasten. Exercise extreme care when using hoisting cables on the sign to avoid damage to the reflective sheeting. Repair or replace damaged signs.

T.135.3.6 ERECTION: For extruded aluminum channels, install lock-nuts on post clips with a torque wrench. Apply 225 inch-pounds of torque to each aluminum lock-nut with the threads dry, clean and unlubricated.

For flat sheet aluminum, attach the sign to posts with either twist-in toggle and buckle straps or stainless steel post-clips. Apply 225 inch-pounds of torque to each stainless steel lock-nut with the threads dry, clean and unlubricated.

Thoroughly clean signs after erection, removing any accumulation of oil, grease, dirt or foreign material.

When exit panels cannot be supported by two sign posts, brace the panel with one or more auxiliary supports.

END OF SECTION

SECTION T.136 OVERHEAD SIGNAGE STRUCTURE – STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS

T.136.1 GENERAL

Conform to requirements of Section T.135.

END OF SECTION

SECTION T.137-162 NOT USED

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SECTION T.163 TYPE C INLET CONCRETE TOP UNIT AND GRATE

T.163.1 GENERAL

T.163.1.1 DESCRIPTION —This work is construction and/or cleaning of endwall, inlet, manhole, and spring box structures of the type indicated.

T.163.1.2 RELATED SECTIONS

PennDOT Standard Publication 408/2016-5
- Section 704 - Cement Concrete
- Section 705 - Joint Materials
- Section 709 - Reinforcement Steel
- Section 711 - Concrete Curing Material and Admixtures
- Section 714 - Precast Concrete Products
- Section 1001 - Cement Concrete Structures
- Section 1105 - Fabricated Structural Steel

T.163.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 37 (Bulletin 25), latest edition.
   4. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.163.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 605

T.163.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 605

T.163.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 605

T.163.2 MATERIALS –

In accordance with PennDOT Publication 408/2016-5, Section 605.2

T.163.3 METHOD OF CONSTRUCTION –

In accordance with PennDOT Publication 408/2016-5, Section 605.3

END OF SECTION

SECTION T.164 TYPE M INLET CONCRETE TOP UNIT AND GRATE

T.164.1 GENERAL

Conform to requirements of Section T.163.

END OF SECTION

SECTION T.165 ADA COMPLIANT INLET GRATE

T.165.1 GENERAL

T.165.1.1 DESCRIPTION —This work is construction and/or cleaning of inlets in the pedestrian tunnel under Ramp N, as indicated.

T.165.1.2 RELATED SECTIONS

A. Section T.163 - Type C Inlet Concrete Top Unit and Grate
B. Section T.164 - Type M Inlet Concrete Top Unit and Grate

T.165.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.165.1.4 SUBMITTALS
Conform to requirements of Section T.163.

T.165.1.5 QUALITY ASSURANCE
Conform to requirements of Section T.163.

T.165.1.6 TRANSPORT, STORAGE AND HANDLING
Conform to requirements of Section T.163.

T.165.2 MATERIALS
Conform to requirements of Section T.163.

T.165.3 METHOD OF CONSTRUCTION
Conform to requirements of Section T.163, in accordance with PennDOT Publication 408/2016-5, Section 605.3, as indicated in the plan drawings, and as follows.

Field verify the dimensions of the existing inlet frame prior to submittal of shop drawings.

END OF SECTION

SECTION T.166 GRADE ADJUSTMENT OF EXISTING MISCELLANEOUS STRUCTURES

T.166.1 GENERAL

T.166.1.1 DESCRIPTION —This work is the grade adjustment of existing inlets, manholes, or utility boxes for a vertical height of 6 inches or less.

T.166.1.2 RELATED SECTIONS

A. In accordance with PennDOT Publication 408/2016-5, Section 606

T.166.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.166.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 606

T.166.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 606

T.166.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 606

T.166.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 606.2

T.166.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 606.3

END OF SECTION

SECTION T.167 18" REINFORCED CONCRETE PIPE, TYPE A, 15' - 3' FILL, SHORE/TRENCH BOX, 100 YEAR DESIGN LIFE

T.167.1 GENERAL

T.167.1.1 DESCRIPTION —This work is construction or reconstruction, inspection, and cleaning of pipe culverts; including subsurface utility facilities, sewers, and storm drains. This work also includes the direct design, manufacturing and testing of reinforced concrete pipes.

T.167.1.2 RELATED SECTIONS

In accordance with PennDOT Publication 408/2016-5, Section 601

T.167.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.
   4. PennDOT Publication 218M (Standards for Bridge Design), latest edition.

T.167.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 601

T.167.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 601

T.167.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 601

T.167.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 601.2

T.167.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 601.3

END OF SECTION

SECTION T.168 STANDARD INLET BOX, HEIGHT </= 10'

T.168.1 GENERAL

Conform to requirements of Section T.163.

END OF SECTION

SECTION T.169 STANDARD DOGHOUSE INLET BOX, HEIGHT </= 10’

T.169.1 GENERAL

T.169.1.1 DESCRIPTION —This work is construction and/or cleaning of a doghouse inlet, as indicated.

T.169.1.2 RELATED SECTIONS

Section T168 - Standard Inlet Box, Height </= 10’
In accordance with PennDOT Publication 408/2016-5, Section 605

T.169.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the “Department” shall be interpreted to mean “the Authority” or it’s “Designee”.
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 37 (Bulletin 25), latest edition.
   4. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.169.1.4 SUBMITTALS

Conform to requirements of Section T.168.

T.169.1.5 QUALITY ASSURANCE

Conform to requirements of Section T.168.

T.169.1.6 TRANSPORT, STORAGE AND HANDLING

Conform to requirements of Section T.168.

T.169.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 605.2

T.169.3 METHOD OF CONSTRUCTION –

In accordance with PennDOT Publication 408/2016-5, Section 605.3, as indicated in the

plan drawings, and as follows.

Form in place or install precast doghouse opening over existing pipe as indicated. Use Class A Cement concrete to fill around existing pipe in structure. Seal remaining gaps around pipe in doghouse opening with Non-Shrink Grout. Obtain the Representative's approval of methods prior to removing the portion of existing pipe inside of structure.

END OF SECTION

SECTION T.170 REBUILT INLET BOX WITH MANHOLE TOP

T.170.1 GENERAL

T.170.1.1 DESCRIPTION - This work is rebuilding an existing inlet box with manhole top.

T.170.1.2 RELATED SECTIONS

A. T.168 – STANDARD INLET BOX, HEIGHT </= 10’

T.170.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the “Department” shall be interpreted to mean “the Authority” or it’s “Designee”.
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.170.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 607

T.170.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 607

T.170.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 607

T.170.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 607.2

T.170.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 607.3.

END OF SECTION

SECTION T.171 CONNECT TO EXISTING DRAINAGE STRUCTURE

T.171.1 GENERAL

T.171.1.1 DESCRIPTION – This work is the creation of a hole or holes in the existing drainage structure wall via coring, drilling, or other approved method; placement of a drainage pipe within the hole in the existing drainage structure wall; and sealing of the gap between the drainage pipe and the existing drainage structure wall.

T.171.1.2 RELATED SECTIONS

PennDOT Publication 408/2016-5, Section 601 and 605

T.171.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.171.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 601 and 605

T.171.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 601 and 605

T.171.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 601 and 605

T.171.2 MATERIALS

Mortar – PennDOT Publication 408/2016-5, Section 1001.2(d)

T.171.3 METHOD OF CONSTRUCTION

Obtain the Representative's approval of coring equipment and methods prior to creating the hole in the existing drainage structure wall. Do not damage the remaining portion of the existing drainage structure.

Flush the hole with clean water or oil free compressed air to remove cuttings and debris.

Place the exposed pipe end within the existing drainage structure wall and cut off the end of the pipe flush with drainage structure wall face. Completely mortar around the pipe to fill the gap between the pipe and the existing drainage structure wall, as directed.

END OF SECTION

SECTION T.172 CLEANING EXISTING PIPE CULVERTS DIAMETERS UP TO AND INCLUDING 36"

T.172.1 GENERAL

Conform to requirements of Section T.167.

END OF SECTION

T.173 REPAIR SEWER CONNECTION

T.173.1 GENERAL

T.173.1.1 DESCRIPTION:

This work is the connection of new bridge structure downspouts to the existing roadway sewer system including construction of pipe runs and associated appurtenances. The upgrade limit of this work is at the base of the pier-mounted vertical downspout piping located at 1'-0" above existing finish grade. Work includes survey of the existing water and sewer mains, and acquisition of PWD Sewer Connection Permit(s) if necessary. The work also includes excavation, excavation support (as necessary), sewer tie-in construction and restoration of disturbed surfaces to match existing conditions prior to the excavation.

This work applies to the following bridge: Westbound over Moyamensing Avenue Overpass.

T.173.1.2 RELATED SECTIONS

A. T.3 - FIELD SURVEY AND ENGINEERING
B. T.6 - MAINTENANCE AND PROTECTION OF TRAFFIC
C. T.20 - CEMENT CONCRETE SIDEWALK, 4" DEPTH
D. T.24 – CLASS 1 EXCAVATION
E. T.39 - PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB – 4" CONCRETE CURB
F. T.40 - PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB – 8" CONCRETE CURB
G. T.340 - MODIFY DRAINAGE SYSTEM
H. T.401 – HEALTH AND SAFETY PLAN
I. T.402 – WASTE MANAGEMENT PLAN
J. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
K. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.173.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018.
       References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition.
       References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

3. PennDOT Standard Drawings:
    a. RC-10M
    b. RC-30M
    c. RC-73M
4. Philadelphia Water Department (PWD) Sewer Connection and Repair Manual

T.173.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit shop drawings with all pertinent information and for all components of the new drainage system, including, but not limited to downspouting, connections, and miscellaneous components to the Engineer for review and approval.
C. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.
D. Submit a dated certification from the manufacturer, fabricator, or producer that the items furnished meet specifications. Such certifications shall be provided for the pipe, pipe fittings, and bituminous materials used for restoration of pipe trenches.
E. Submit a plan for removal and capping of the existing drainage system and installation of new drainage system to the Engineer for review and approval.
F. Submit a plan for filling the existing drainage pipes with concrete to the Engineer for review and approval.
G. Submit a plan for tie-in of new drainage system to existing network of storm drainage piping and/or manholes.

T.173.2 MATERIALS

In accordance with PWD Sewer Connection and Repair Manual.

T.173.3 METHOD OF CONSTRUCTION

In accordance with PWD Sewer Connection and Repair Manual, PennDOT Publication 408/2016-5, Sections 204 and 601, and PennDOT Standard Drawings RC-10M and RC-30M, and as follows:

T.173.3.1 GENERAL

Perform work in accordance with the staging indicated on the Maintenance and Protection of Traffic Plans.

Field verify the locations, dimensions, elevations, and types of materials of the existing public sewer system and the existing subsurface downspout sewer connection pipes. Determine if the existing subsurface downspout sewer connection pipes can be utilized, or if a new sewer connection must be installed.

Obtain necessary permits in accordance with the PWD Sewer Connection and Repair Manual.

Field verify size, dimensions, and types of materials, as necessary to satisfactorily complete the work.

Field-verify all pipe lengths and angles prior to fabrication and beginning this work. Include fittings as required.

Coordinate work with other work that may affect the newly installed drainage system, including, but not limited to reinforced concrete repairs and bridge superstructure jacking.

Access by DRPA maintenance personnel, police, and outside utility personnel must be maintained during execution of this work.

T.173. 3.2 CONSTRUCTION

In existing paved areas, score the pavement and excavate to neat lines at the trench edges. Excavate to expose the existing drainage pipe or drainage structure at the downgrade limit of work. Field survey the existing invert elevation at the proposed connection location. Excavate the remainder of the trench beginning at the base of the pier downspout and proceeding downgrade. Construct the trench and lay the pipe to evenly distribute the available fall. Provide a minimum of 1/8 inch per foot of slope. Take adequate precautions to protect any existing utility or feature with particular care given to the Moyamensing Avenue Sewer.

After the pipe is satisfactorily laid and tied to the existing network of storm drainage pipes or structures, backfill the entire trench.

Lay pipe at least 2 weeks prior to constructing the base course or pavement. Lay with bells or grooves up grade.

Remove existing downspout sewer connection pipes which will not utilized with the proposed drainage system. Satisfactorily dispose of removed portions of drainage system.

Restore the existing ground/reconstruct existing pavement, curbs and/or sidewalks, or other disturbed surfaces damaged by the work to match existing conditions prior to the performance of the work. Perform restoration of existing ground, pavement, sidewalks, and curbs in accordance with specifications.

Management of any existing soil/embankment material to be performed in accordance with T.401, T.402, T.403, T.405, T.406 T.407 and T.408.

Cleaning - After the installation of the new system is complete (including sewer tie-ins, as required), discharge a sufficient volume of water into the scuppers to clean any remaining residue and to demonstrate that the system is clear and functioning properly. Dispose of any material cleaned from the drainage system in a satisfactory manner. Demonstrate to the Engineer that the existing pipes are clear and free flowing.

Repair or replace any portions of the existing structure or drainage system to remain that are damaged by the repair operations to the satisfaction of the Engineer at no cost to the Authority.

END OF SECTION

SECTION T.174 CLEANING DRAINAGE STRUCTURES

T.174.1 GENERAL

Conform to requirements of Section T.163.

END OF SECTION

SECTION T.175-199 NOT USED

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SECTION T.200 COMPOST FILTER SOCK, 12" DIAMETER

T.200.1 GENERAL

T.200.1.1 DESCRIPTION — This work is furnishing, placement, and maintenance of a compost filter sock erosion and sedimentation pollution control system.

T.200.1.2 RELATED SECTIONS

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.200.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.200.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.200.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.200.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.200.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 867.2.

T.200.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 867.3.

END OF SECTION

SECTION T.201 COMPOST FILTER SOCK, 18” DIAMETER

T.201.1 GENERAL

Conform to requirements of Section T.200.

END OF SECTION

SECTION T.202 COMPOST FILTER SOCK, 24” DIAMETER

T.202.1 GENERAL

Conform to requirements of Section T.200.

END OF SECTION

SECTION T.203 INLET FILTER BAG FOR TYPE M INLET

T.203.1 GENERAL

T.203.1.1 DESCRIPTION —This work is the furnishing, installing, maintaining, and removal of storm inlet protection of the type indicated.

T.203.1.2 RELATED SECTIONS

In accordance with PennDOT Publication 408/2016-5, Section 860.

T.203.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.203.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 860.

T.203.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 860.

T.203.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 860.

T.203.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 860.2.

T.203.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 860.3.

END OF SECTION

SECTION T.204 INLET FILTER BAG FOR TYPE C INLET

T.204.1 GENERAL

Conform to requirements of Section T.203.

END OF SECTION

SECTION T.205 PIPE/GRAVEL INLET PROTECTION FOR TYPE M INLET

T.205.1 GENERAL

Conform to requirements of Section T.203.

END OF SECTION

SECTION T.206 PIPE/GRAVEL INLET PROTECTION FOR TYPE C INLET

T.206.1 GENERAL

Conform to requirements of Section T.203.

END OF SECTION

SECTION T.207 SILT BARRIER FENCE, 18" HEIGHT

T.207.1 GENERAL

T.207.1.1 DESCRIPTION —This work is furnishing, placement, maintenance, and removal of silt barrier fences of the height indicated.

T.207.1.2 RELATED SECTIONS

In accordance with PennDOT Publication 408/2016-5, Section 865

T.207.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.207.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 865.

T.207.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 865.

T.207.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 865.

T.207.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 865.2.

T.207.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 865.3.

END OF SECTION

SECTION T.208 SILT BARRIER FENCE, 30” HEIGHT

T.208.1 GENERAL

Conform to requirements of Section T.207.

END OF SECTION

SECTION T.209 ROCK, CLASS R-3

T.209.1 GENERAL

T.209.1.1 DESCRIPTION —This work is construction of rock lining of the class indicated.

T.209.1.2 RELATED SECTIONS

A. T.22 NO. 57 COARSE AGGREGATE
B. T.26 CLASS 2 EXCAVATION
C. PennDOT Publication 408/2016-5, Section 850

T.209.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.209.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 850.

T.209.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 850.

T.209.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 850.

T.209.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 850.2.

T.209.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 850.3.

END OF SECTION

SECTION T.210 ROCK APRON

T.210.1 GENERAL

T.210.1.1 DESCRIPTION — This work is construction of a rock outlet protection of the type indicated.

T.210.1.2 RELATED SECTIONS

A. T.26 CLASS 2 EXCAVATION
B. PennDOT Publication 408/2016-5, Section 851.

T.210.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.210.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 851.

T.210.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 851.

T.210.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 851.

T.210.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 851.2.

T.210.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 851.3.

END OF SECTION

SECTION T.211 SEEDING FORMULA E

T.211.1 GENERAL

T.211.1.1 DESCRIPTION —This work is furnishing and placing of seed and soil supplements of the type indicated, the application of herbicides, and mowing requirements.

T.211.1.2 RELATED SECTIONS

A. T.213 TEMPORARY SHORT-TERM, ROLLED EROSION CONTROL PRODUCT, TYPE 2D
B. T.214 MULCHING – STRAW
C. PennDOT Publication 408/2016-5, Section 804

T.211.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

B. The following definitions apply:
   1. **Certified Seed**. Seed of known genetic identity that has been field and laboratory inspected and tested during its period of growth to provide a source of high quality ground cover and ensure genetic identity and purity. Seeds are certified by recognized certifying agencies that conform to the certification laws and regulations of Pennsylvania or other states. Certification identification is indicated on all seed lot tags or labels.
   2. **Germination**. The emergence and development from the seed embryo of essential plant structures that can produce a normal plant under favorable conditions and is represented by a percentage of an identified seed quantity exclusive of hardseed.
   3. **Hardseed**. Unscarified seed that remains hard or has not germinated at the end of a prescribed test period because the seed has not absorbed water due to an impermeable seed coat.
   4. **Pure Live Seed (PLS)**. A term that defines the planting quality of seed exclusive of inert matter and all other seeds not of the seed type being analyzed as determined by inspection and testing regulations. PLS is often used where seed industry standards have not been established for minimum acceptable purity and germination limits.
   5. **Purity**. The genetic identity of a seed that will produce a known plant and is represented by a percentage of an identified seed quantity or seed lot.

6. **Seed Formula**. A seed mixture of more than one variety of a seed kind in excess of 5% by weight of the whole.
7. **Seed Lot**. A definite quantity of seed identified by an assigned number or mark which is uniform throughout for all seed quality factors stated on the lot label or are within permitted tolerances.
8. **Seed Mixture**. A seed batch that consists of more than one kind of seed when each kind is present in excess of 5% of the whole.
9. **Variety**. A plant subdivision that can be differentiated from other plants of the same kind by growth, yield, fruit, color, seed, or other identifying characteristics.
10. **Weed Seed**. Seed producing plant generally recognized as a weed by the Pennsylvania Department of Agriculture which includes the seed of prohibited and restricted noxious weeds.

T.211.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 804.

T.211.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 804.

T.211.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 804

T.211.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 804.2.

T.211.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 804.3

END OF SECTION

SECTION T.212 SEEDING AND SOIL SUPPLEMENTS FORMULA L

T.212.1 GENERAL

Conform to requirements of Section T.211.

END OF SECTION

SECTION T.213 TEMPORARY SHORT-TERM, ROLLED EROSION CONTROL PRODUCT, TYPE 2D

T.213.1 GENERAL

T.213.1.1 DESCRIPTION —This work is furnishing, placement, and maintenance of temporary and permanent rolled erosion control products of the types indicated.

T.213.1.2 RELATED SECTIONS

A. T.211 SEEDING FORMULA E
B. T.212 SEEDING AND SOIL SUPPLEMENTS FORMULA L
C. PennDOT Publication 408/2016-5, Section 806

T.213.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.213.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 806.

T.213.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 806.

T.213.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 806.

T.213.2 MATERIALS –

In accordance with PennDOT Publication 408/2016-5, Section 806.2.

T.213.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 806.3.

END OF SECTION

SECTION T.214 MULCHING - STRAW

T.214.1 GENERAL

T.214.1.1 DESCRIPTION —This work is the furnishing, placing, anchoring, and maintaining of mulch of the type indicated.

T.214.1.2 RELATED SECTIONS

A. T.211 SEEDING FORMULA E
B. T.212 SEEDING AND SOIL SUPPLEMENTS FORMULA L
C. PennDOT Publication 408/2016-5, Section 805

T.214.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.214.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016, Section 805

T.214.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016, Section 805

T.214.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016, Section 805

T.214.2 MATERIALS

In accordance with PennDOT Publication 408/2016, Section 805.2

T.214.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016, Section 805.3

END OF SECTION

SECTION T.215 COMPOST SOCK WASHOUT

T.215.1 GENERAL

T.215.1.1 DESCRIPTION – This work is the removal and disposal of concrete waste by furnishing, maintaining, and removing a temporary compost sock washout.

T.215.1.2 RELATED SECTIONS

A. T.202 COMPOST FILTER SOCK 24

T.215.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.215.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.215.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.215.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 867.

T.215.2 MATERIALS

Compost Filter Sock, In accordance with PennDOT Publication 408/2016-5, Section 867.2.

Wood Stakes –
1. Untreated fir, redwood, cedar or pine and cut from sound timber
2. Straight and free of loose or unsound knots and their defects which would render stakes unfit for use
3. Pointed on the end to be driven into the ground at least 2" x 2" x 36"

Impervious Geomembrane, In accordance with PennDOT Publication 408/2016-5, Section 736.

T.215.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 867.3, as indicated, and as follows:

Place compost sock washout facility at the job site:

1. Before concrete placement activities start
2. In the immediate area of concrete work as approved by the Representative
3. No closer than fifty (50) feet from streams, storm drain inlets or watercourses
4. Away from construction traffic or public access areas

Maintain the Compost Sock Washout facility as required for the duration of the concrete operations.

Remove the concrete washout facility when concrete operations are finished. Dispose of the concrete washout facility components in a satisfactory manner.

END OF SECTION

SECTION T.216 PUMPED WATER FILTER BAG

T.216.1 GENERAL

T.216.1.1 DESCRIPTION – This work is furnishing, installing, maintaining, and disposing of a Pumped Water Filter Bag as indicated.

T.216.1.2 RELATED SECTIONS

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.216.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.216.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.216.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.216.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.216.2 MATERIALS

In accordance with PennDOT Publication 408/2016-5, Section 855.2.

T.216.3 METHOD OF CONSTRUCTION

In accordance with PennDOT Publication 408/2016-5, Section 855.3.

END OF SECTION

SECTION T.217 REPLACEMENT PUMPED WATER FILTER BAG

T.217.1 GENERAL

Conform to requirements of Section T.216.

END OF SECTION

SECTION T.218 SUMP PIT

T.218.1 GENERAL

T.218.1.1 DESCRIPTION – This work is furnishing, placing, maintaining, and removing of a Sump Pit as indicated.

T.218.1.2 RELATED SECTIONS

A. T.216 PUMPED WATER FILTER BAG
B. T.217 REPLACEMENT PUMPED WATER FILTER BAG

T.218.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.218.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.218.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.218.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 855.

T.218.2 MATERIALS

Aggregate – AASHTO No. 57 Stone, In accordance with PennDOT Publication 408/2016-5, Section 703.

Perforated CMP or PVS Pipe, In accordance with PennDOT Publication 408/2016-5, Section 601.

T.218.3 METHOD OF CONSTRUCTION

Locate sump pit as indicated on the plan at low point within the work area but outside of the construction activity.

Excavate sump pit as required. Minimum diameter of pit bottom is 24" larger than the diameter of the stand pipe. Minimum depth of the pit is 24" below the water level in work area. Set perforated stand pipe on 12" of clean AASHTO No. 57 coarse aggregate.

Fill void spaces around stand pipe with AASHTO No. 57 coarse aggregate.

Set pump intake hose inside standpipe. Pump discharges to a sediment filter bag as indicated on the plan.

Maintain the sump pit as required to construct the project. Upon completion, remove the riser pipe, restore the area to its original condition and suitably dispose of waste material.

END OF SECTION

SECTION T.219 ROCK CONSTRUCTION ENTRANCE

T.219.1 GENERAL

T.219.1.1 DESCRIPTION – This work is construction, maintenance, and removal of a temporary rock construction entrance.

T.219.1.2 RELATED SECTIONS

A. T.5 CLEARING AND GRUBBING
B. T.24 CLASS 1 EXCAVATION

T.219.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
   1. PennDOT Publication 408/2016-5, dated 10/05/2018.
   2. PennDOT Publication 35 (Bulletin 15), latest edition.
   3. PennDOT Publication 72M (Standards for Roadway Construction), latest edition.

T.219.1.4 SUBMITTALS

In accordance with PennDOT Publication 408/2016-5, Section 849.

T.219.1.5 QUALITY ASSURANCE

In accordance with PennDOT Publication 408/2016-5, Section 849.

T.219.1.6 TRANSPORT, STORAGE AND HANDLING

In accordance with PennDOT Publication 408/2016-5, Section 849.

T.219.2 MATERIALS

Aggregate – AASHTO No. 1 Stone. In accordance with PennDOT Publication 408/2016-5, Section 703.2.

Geotextile – Class 4, Type A. In accordance with PennDOT Publication 408/2016-5, Section 735.

T.219.3 METHOD OF CONSTRUCTION

As shown in the PennDOT Standard Drawings, as indicated, and as follows:

Clear and grub the footprint of the rock construction entrance as specified in Section T.5. Construct the rock construction entrance by excavating as specified in Section T.24, forming embankment as specified in Section T.30 and PennDOT Publication 408/2016-5, Section 206.3.

Place the geotextiles, as specified in PennDOT Publication 408/2016-5, Section 735 and as shown in the PennDOT Standard Drawings.

Provide satisfactory drainage through the rock construction entrance.

When directed, place additional rock to satisfactorily maintain the rock construction entrance.

When the construction entrance is no longer needed, as directed, remove the entrance and restore the area to existing or better conditions.

END OF SECTION

SECTION T.220-230 NOT USED

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SECTION T.231 AWG #2, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

T.231.1 GENERAL

T.231.1.1 DESCRIPTION

This work is the furnishing and installation of electrical conductors for roadway lighting system, which includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.231.1.2 SUBMITTALS

Product Data.
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

Conductor

Certification.
Submit certification that the following products conform to the specified requirements:

Conductor

T.231.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing association and that is acceptable to authorities having jurisdiction.
    1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Section T.18.3.4.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with NFPA 70.

T.231.2 MATERIALS

T.231.2.1 Cable - Section 1101.08

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.231.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.
   5. Anaconda
   6. National
   7. Or DRPA Approved Equal.

B. Refer to Section T.274.3.1 "Conductor and Insulation Applications" for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC .

T.231.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.
   6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.231.3 METHOD OF CONSTRUCTION

T.231.3.1 T.18.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces:
Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade:
Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits:
Type THHN-THWN, in raceway.

F. Class 2 Control Circuits:
Type THHN-THWN, in raceway.

T.231.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

T.231.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than spliced conductors.
1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.231.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:

Testing: Perform the following field quality-control testing:
1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION T.232 AWG #4, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

T.232.1 GENERAL

Conform to requirements of Section T.231.

END OF SECTION

SECTION T.233 TRENCH AND BACKFILL, TYPE I

T.233.1 GENERAL

T.233.1.1 DESCRIPTION

This work shall consist of trenching and backfilling for conduit installation as specified herein and as directed by the Engineer.

T.233.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.407 – OFF-SITE DISPOSAL, SOLIDS

T.233.1.3 QUALITY ASSURANCE

Conform to the following:

E. Contract Drawings;

F. Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.3 (c).

T.233.2 METHOD OF CONSTRUCTION

A. Trench and backfill for conduit in accordance with the Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.3.

B. Place multiple conduits vertically with six (6) inches between conduits carrying the same facility and twelve (12) inches between power and communication conduits.

C. Place detectable marking tape a minimum twelve (12) inches below grade.

D. The project area is expected to contain historic fill. Contractor shall follow procedures outlined in related sections listed in T.233.1.2 to protect site workers and conform to the Pennsylvania Department of Environmental Protection's (PADEP) Management of Fill Policy.

E. If Contractor imports soil onto the site for backfilling trenches, Contractor must demonstrate soil quality to the Engineer in accordance with Certification of Clean Fill Form FP-001 Section 2A or 2B prior to delivery of material. The Engineer

will not accept soils qualified under Form FP-001 Section 2C (environmental due diligence without soil test results). Soil quality will be demonstrated through a sampling program that complies with the PADEP Management of Fill Policy Appendix A. All data must be presented to the Engineer for approval prior to delivery of the material to the site. All sampling and laboratory analysis is at the expense and risk of the Contractor.

END OF SECTION T.233

SECTION T.234 TRENCH AND BACKFILL, TYPE II

T.234.1 GENERAL

T.234.1.1 DESCRIPTION

This work shall consist of trenching and backfilling for conduit installation as specified herein and as directed by the Engineer.

T.234.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.407 – OFF-SITE DISPOSAL, SOLIDS

T.234.1.3 QUALITY ASSURANCE

Conform to the following:

E. Contract Drawings;

F. Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Section 954.3 (a).

T.234.2 METHOD OF CONSTRUCTION

A. Trench and backfill for conduit in accordance with the Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Section 954.3 (a).

B. Place multiple conduits vertically with six (6) inches between conduits carrying the same facility and twelve (12) inches between power and communication conduits.

C. Place detectable marking tape a minimum twelve (12) inches below grade.

D. The project area is expected to contain historic fill. Contractor shall follow procedures outlined in related sections listed in T.234.1.2 to protect site workers and conform to the Pennsylvania Department of Environmental Protection's (PADEP) Management of Fill Policy.

E. If Contractor imports soil onto the site for backfilling trenches, Contractor must demonstrate soil quality to the Engineer in accordance with Certification of Clean Fill Form FP-001 Section 2A or 2B prior to delivery of material. The Engineer

will not accept soils qualified under Form FP-001 Section 2C (environmental due diligence without soil test results). Soil quality will be demonstrated through a sampling program that complies with the PADEP Management of Fill Policy Appendix A. All data must be presented to the Engineer for approval prior to delivery of the material to the site. All sampling and laboratory analysis is at the expense and risk of the Contractor.

END OF SECTION T.234

SECTION T.235 HORIZONTAL BORING

T.235.1 GENERAL

T.235.1.1 DESCRIPTION

This work is horizontal boring in soil under pavement for conduit installation, as indicated on the drawings, as specified herein and as directed by the Engineer.

T.235.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.407 – OFF-SITE DISPOSAL, SOLIDS

T.235.1.3 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Section 1101.09 (d).

T.235.2 MATERIALS

A. Steel Casing Pipe:
   1. Weld-able Steel Pipe

      a. Minimum tensile strength: 60,000 psi

      b. Minimum yield strength: 35,000 psi

      c. Minimum wall thickness: 0.532 inches

      d. Lengths and diameters as required

      e. In accordance with ASTM A-139, Grade B

T.235.3 METHOD OF CONSTRUCTION

A. Perform horizontal boring in accordance with the Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.3.

B. Install crossings by the boring or jacking method and conform in all respects to the requirements contained herein.

C. Ensure that all excavation, backfill, sheeting, shoring, bracing, and dewatering complies with the applicable requirements of Publication 408/2016 Edition, Change No. 5 and the requirements of the applicable authorities.

D. The project area is expected to contain historic fill. Contractor shall follow procedures outlined in related sections listed in T.234.1.2 to protect site workers and conform to the Pennsylvania Department of Environmental Protection's (PADEP) Management of Fill Policy.

E. If Contractor imports soil onto the site for backfilling, Contractor must demonstrate soil quality to the Engineer in accordance with Certification of Clean Fill Form FP-001 Section 2A or 2B prior to delivery of material. The Engineer will not accept soils qualified under Form FP-001 Section 2C (environmental due diligence without soil test results). Soil quality will be demonstrated through a sampling program that complies with the PADEP Management of Fill Policy Appendix A. All data must be presented to the Engineer for approval prior to delivery of the material to the site. All sampling and laboratory analysis is at the expense and risk of the Contractor.

T.235.3.1 BORING INSTALLATION

A. Push the pipe into the fill with a boring auger rotating inside the pipe to remove the spoil.

B. Provide the front of the casing pipe with suitable mechanical arrangements or devices that positively prevent the auger and cutting head from leading the pipe so that there is no unsupported excavation ahead of the pipe.

C. Provide equipment and mechanical arrangements or devices used to bore and remove the earth and/or rock that are removable from within the casing pipe in the event an obstruction is encountered.

D. Arrange the face of the cutting edge so that it provides reasonable obstruction to the free flow of soft or poor soil.

E. Do not use water or other liquids to facilitate casing emplacement or spoil removal

F. Provide that the boring hole diameter is essentially the same as the outside diameter of the pipe

G. If voids develop around the casing pipe as it is bored, pump cement grout to fill

all such voids, or fill by other means acceptable to the Engineer

H. Fill all voids as specified hereinafter as soon as possible after completion of boring operation

T.235.3.2 JACKING INSTALLATION

A. Perform jacking in accordance with the Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.3 (g).

B. Provide that the steel casing pipe installed by the jacking method is weld-able steel pipe

C. Ensure that the steel pipe and welding thereof meets all requirements of the steel pipe specified for installation by the boring method specified above

D. Design bracing and backstops and use jacks of sufficient rating such that jacking is accomplished in a continuous manner until the leading edge of the pipe reaches the required final position

E. Perform the jacking operation such that the diameter of the jacked hole is essentially the same as the outside diameter of the pipe

F. If voids develop around the casing pipe as it is jacked, pump cement grout to fill all such voids, or fill by other means acceptable to the Engineer

G. Fill all voids as specified hereafter as soon as possible after completion of jacking operation

T.235.3.3 GROUTING

A. Start at the lowest, middle hole of each section to be grouted, grout holes above to remain open, and proceed upward progressively and, if possible, simultaneously on both sides of the casing or tunnel until all voids are completely filled

B. Provide threaded grout holes (at a minimum) as follows:

1) Three (3) holes spaced equally across the circumference of the pipe with one hole located at the top of the casing pipe

2) Repeat grout hole patterns every five (5) feet along the pipe

C. Provide grout holes in addition to those specified where directed by the Engineer to insure filling of all voids

D. Do not the following grouting pressures exceed at any given location: one (1) psi for each foot of overburden in rock and one-half (1/2) psi for each foot of overburden in earth.

T.235.3.4 OBSTRUCTIONS

A. If an obstruction is encountered during jacking or boring installation and it is impossible to advance the casing pipe, get approval from the Engineer to deviate from the work as specified.

B. Submit any alternate installation locations and/or methods to the Engineer for review and approval before any work is allowed to start.

T.235.3.5 END SEALS

A. Install end seals at each end of the casing of sufficient strength and quality to support the filling operation, and to support the backfill

END OF SECTION T.235

SECTION T.236 CONDUIT ATTACHMENT TO STRUCTURE

T.236.1 GENERAL

T.236.1.1 DESCRIPTION

This work is furnishing and installing conduit and expansion/deflection fittings of various types and sizes, attached to structures, as indicated on the drawings, as specified herein and as directed by the Engineer.

T.236.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.2, 948.2, and 1101.09.

C. Meet UL 6, NEC 2011

T.236.1.3 SUBMITTALS

At least ten (10) days before beginning the installation, submit the Manufacturer's printed product information/cut-sheet for DRPA approval indicating material characteristics and performance criteria.

T.236.2 MATERIALS

A. Rigid Metal Conduit (RMC)

1. Provide nominal 2-inch duct with ribbed polyethylene galvanized rigid metal / steel conduit with protective coating in accordance with Section 1101.09 (c) (1)

B. Meet UL 6, NEC 2011

C. Mounting Hardware -- Provide stainless steel straps or malleable iron strap conduit support hangers per manufacturer's recommendations and approved by the Engineer.

T.236.3 METHOD OF CONSTRUCTION

A. Install RMC conduit in accordance with the Pennsylvania Department of

Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.3 (g); 910.3 (h), except paragraphs 6, 7 and 9; 920.3 (h); and 954.3 (b).

B. Plug/cap all unused conduits at every ITS node cabinet and junction box

C. Do not use cement to assemble individual conduit or bend sections

D. Use fixed or flexible bends of the same material as recommended by the manufacturer to avoid obstructions not shown on the Plans

E. Provide one expansion joint at every expansion joint on bridges, every 100 linear feet of exposed conduit and at locations where conduit transitions from buried to exposed

F. Provide one slip stop ring for every 200 linear feet of exposed conduit and at every structure crossing

G. Provide adapters at every change of conduit size and type

H. Include mule tape (pull lines) with the installation of all conduits

I. Conduit Installation on Existing Structures:

1. Attach the conduit to existing structures as indicated

2. If alternate attachment details are proposed, submit for approval by the Engineer

3. Verify the location of any reinforcement in concrete prior to drilling holes

4. Utilize a pachometer or similar device to determine reinforcement location

J. Provide stainless steel straps or malleable iron strap conduit support hangers spaced per manufacturer's recommendations

K. Furnish holes not more than 1 mm (1/32 inch) larger in diameter than the true decimal equivalent of the nominal diameter. The slightly conical hole that results from punching operations is acceptable

L. Holes produced by flame cutting are not allowed

M. For any connection, instead of sub-punching and reaming, or sub-drilling and reaming, the fabricator may drill holes full size with all thicknesses of material assembled in proper position.

N. When using a steel template, ream and drill full size all field connection holes through the template after the template has been placed in the proper position, angled, and firmly bolted into place

O. Use templates that are exact duplicates for reaming matching members or the opposite faces of a single member

P. Accurately locate templates used for connections on like parts or members so that the parts or members are duplicates and require no match-marking

Q. For sign structure mounting, attach rigid metal conduit with steel conduit clamps

R. Bend radius in conduits and junction boxes not to exceed the bending radii recommended by the cable manufacturer

S. Test all conduits using an appropriately-sized mandrel, as directed by the Engineer

T. Ensure adequate clearance for access to existing junction boxes, light fixtures, drainage fixtures and other existing fixtures that may require future access

END OF SECTION T.236

SECTION T.237 2-INCH DIRECT BURIAL CONDUIT (PVC)

T.237.1 GENERAL

T.237.1.1 DESCRIPTION

This work shall consist of furnishing and installing 2-inch PVC conduit, as indicated on the drawings, as specified herein and as directed by the Engineer.

T.237.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.3, 1101.09, and 1104.05 (a).

T.237.1.3 SUBMITTALS

At least ten (10) days before beginning the installation, submit the Manufacturer's printed product information/cut-sheet for DRPA approval indicating material characteristics and performance criteria.

T.237.2 MATERIALS

A. Provide PVC conduit made from virgin polyvinyl resins conforming to ASTM D 1784, Class 12454-B. Ensure that the conduit exceeds all the property requirements including impact strength, chemical resistance, and flammability as listed in UL 651 and NEMA TC 2.

B. Provide PVC conduit that is Type II, Schedule 40 suitable for direct burial underground in grass and/or berm areas, and Schedule 80 under roadways.

C. Provide fittings that are made from high-impact PVC, are the socket type, and are joined to the conduit using PVC solvent cement. Ensure that fittings, including couplings, conform to NEMA TC 3. Use solvent cement to join PVC conduit that is a heavy-bodied cement complying with ASTM D 2564 and apply with a natural bristle or nylon brush.

T.237.3 METHOD OF CONSTRUCTION

A. Install PVC conduit in accordance with the Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.3, 954.3, 1101.09, and 1104.05.

END OF SECTION T.237

SECTION T.238 2-INCH EXPOSED CONDUIT (RMC)

T.238.1 GENERAL

T.238.1.1 DESCRIPTION

This work shall consist of furnishing and installing 2-inch rigid metallic conduit (RMC), as indicated on the drawings, as specified herein and as directed by the Engineer.

T.238.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.3, 910.3(g), 920.3(h), 1101.09, and 1104.05 (a).

T.238.1.3 SUBMITTALS

At least ten (10) days before beginning the installation, submit the Manufacturer's printed product information/cut-sheet to the DRPA for approval indicating material characteristics and performance criteria.

T.238.2 MATERIALS

A. For exposed RMC and fittings on structures, provide aluminum conforming to UL standards for rigid metallic conduit.

B. Use fittings and accessories for aluminum conduit that are made of aluminum or stainless steel.

C. Fabricate aluminum conduit and fittings from a copper-free, corrosion-resistant aluminum alloy, conforming to ASTM B 429, Alloy 6061-T6.

D. For direct burial RMC, provide steel conduit that conforms to UL 6, UL 514B, and ANSI C80.1.

E. Manufacture steel conduit from milled steel tubing with a wall thickness equivalent to Schedule 40 pipe. Hot-dip galvanize the conduit for the entire length conforming ASTM A 123, including the threads. Ensure that the minimum weight of galvanized coating is 1 ounce per square foot. Supply electro-galvanized couplings.

F. Manufacture rigid metallic conduit sweep elbows to conform to UL 6.

T.238.3 METHOD OF CONSTRUCTION

A. Install exposed RMC in accordance with the Pennsylvania Department of Transportation Standard Drawings and Specifications, Publication 408, 2016 Edition, Change No. 5, Sections 910.3(g), 920.3(h), and 954.3.

END OF SECTION T.238

SECTION T.239 COMMUNICATIONS JUNCTION BOX, JB-11

T.239.1 GENERAL

T.239.1.1 DESCRIPTION

This work shall consist of furnishing and installing a communications junction box as indicated on the drawings, as specified herein and as directed by the Engineer.

T.239.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. Pennsylvania Department of Transportation Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.

T.239.1.3 SUBMITTALS

At least ten (10) days prior to beginning work, submit shop drawings to the DRPA for approval, showing the dimensions and fabrication details for the junction box.

T.239.2 MATERIALS

A. Provide a precast concrete open-bottom junction box (forty-two (42) inch x forty-two (42) inch x thirty (30) inch) per the contract drawings.

B. The junction box shall have the label "COMMUNICATION" cast into the cover.

C. All materials incorporated into the work shall meet the requirements of the Pennsylvania Department of Transportation Specifications, Publication 408, 20239 Edition, Change No. 5, Section 910.2.

T.239.3 METHOD OF CONSTRUCTION

A. Obtain acceptance of any change in box location before installation.

B. Excavate and install the box. Backfill around the box and dispose of excess or unsuitable material.

C. Install individual ground rods. Install additional ground rods as required if the resistance to ground is greater than 25 ohms. Attach the ground rod to the grounding electrode conductor with an exothermic weld or a bronze connector. Coat the connection with approved corrosion inhibitor. Provide an equipment

grounding conductor with all circuits. Do not connect the neutral to ground except at the service location. Provide an insulated equipment grounding conductor as specified for the circuit conductors.

D. Ground exposed metal parts of junction boxes with a minimum No. 4 AWG ground wire and a minimum 1/2-inch by 8-foot ground rod. Connect the grounding electrode conductor to the ground rod with either an exothermic weld or with a bronze connector clamp. Connection to an adjacent system ground rod is allowable.

END OF SECTION T.239

SECTION T.240-242 AIR-BLOWN FIBER OPTIC CABLE, 6 STRAND, 12 STRAND, & 24 STRAND

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 240 AIR-BLOWN FIBER OPTIC CABLE, 6 STRAND
ITEM 241 AIR-BLOWN FIBER OPTIC CABLE, 12 STRAND
ITEM 242 AIR-BLOWN FIBER OPTIC CABLE, 24 STRAND

T.240.1 GENERAL

T.240.1.1 DESCRIPTION

A. This Section describes the technical and performance requirements for deploying fiber-optic communications systems on the Pennsylvania Approach to the Walt Whitman Bridge (WWB) / I-76, and its corresponding facilities.

B. This Specification requires that the Contractor design, procure, furnish, install, test, and commission complete fiber-optic communications systems capable of transporting single-mode fiber-optic signals.

C. The fiber-optic cable will consist of a scalable, air-blown fiber system consisting of the following components:
   1. Cable sheath with sub-tube sections capable of interconnection using couplings having for OSP and plenum applications.
   2. Fiber-optic strand bundles.

D. Furnish and provide all required labor, tools, material, storage, and transportation required to install, test, and commission the fiber-optic infrastructure, equipment, and documents.

E. The WWB fiber-optic communications system will have a continuous conduit path from the western end of the DRPA's I-76 Corridor with a termination end point at the WWB Administration Building IS room in Philadelphia, PA. There will be distribution and termination cabinets at each sign structure with ITS devices (CCTV, VMS, VSLS, and LUCS) and at CCTV HUBs.

T.240.1.2 RELATED DOCUMENTS

A. General provisions of the Contract, as stipulated in Sections A through SP, apply to this Section.

B. SECTION T - TECHNICAL PROVISIONS

T.240.1.3 QUALIFICATIONS

A. The Contractor shall have and demonstrate via professional references a minimum five (5) years of conduit and cable installation experience on projects comparable to the size of this project or larger.

B. The Contractor must be a certified installer of the proposed air-blown fiber-optic system by the manufacturer of the same air-blown fiber-optic system.

C. The Contractor shall be a certified fiber-optic installer, as well as certified on the fiber-optic splicing and testing equipment.

T.240.1.4 SUBMITTALS

A. Product Data: For all proposed components including but not limited to air-blown fiber-optic system, fiber-optic glass specifications, splicing and termination components, fiber-optic patch cables, and connectors.

B. Certifications
   1. Fiber Optic System Installer.
   2. Fiber Optic Testing Technician.
   3. OTDR and power meter Calibration Certification.
      a. Test equipment certifications older than one (1) year will be deemed unacceptable.

C. Fiber optic test reports. (See Part 3: Testing for requirements)
   1. OTDR
   2. Power meter

D. As-Built Drawings in both electronic and hard copy.
   1. As-Built documentation shall include, but not be limited to:
      a. Site specific Drawings
      b. Equipment model and serial numbers
      c. Fiber cable assignments, ID’s, and wiring details
      d. Cable/connector types

E. The Contractor will submit Maintenance and Protection of Traffic (MPT) plans meeting DRPA requirements for approval.

T.240.1.5 QUALITY ASSURANCE

A. Installers shall be trained and certified by the equipment and cable (electrical and communications) manufacturer, to install, splice, terminate, and test applicable cables.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with current version of applicable codes, standards, and regulation to include, but not limited to IEEE, BICSI, EIA/TIA 568C, and NFPA 70/130.

T.240.1.6 PROJECT CONDITIONS

A. All on-site activity shall be coordinated and authorized by DRPA prior to the start of all work. To include, but not limited to work hours, areas of activity, and on-site protection requirements.

B. Contractor shall submit a schedule at least five (5) days in advance (or as directed) describing the specific work, activity and duration.

C. Refer to the DRPA Safety Administrative Manual for required training, proper identification, project safety requirements, and procedures.

T.240.1.7 WARRANTY

A. Contractor shall provide at a minimum standard on-site manufacturer's warranty service for one (1) year from the date of acceptance.

T.240.2 MATERIALS

T.240.2.1 AIR-BLOWN FIBER OPTIC CABLE SYSTEM

A. All components of the Air-Blown Fiber Optic System shall be manufactured by the same company and shall be utilized for the appropriate application. Air-Blown Fiber Optic System shall be Sumitomo FutureFlex, Dura-Line FuturePath or an approved equal.

B. Outside Plant (OSP) Cable, coupling and accessories.
   1. Micro-tube configurations:
      a. Trunk cable: 19
      b. Laterals: 19
   2. All dielectric, outdoor rated.
   3. Incorporate a non-gel water blocking material.
   4. The cable must be free of holes, splits, and blisters. The cable jacket must not contain metal elements and must be of a consistent thickness. Cable jackets must be marked with manufacturer's name, sequential foot markings, year of manufacture, and a telecommunication handset

symbol, as required by Section 350G of the National Electrical Safety Code (NESC).

5. All cable terminations will use a cable grip type device/fitting to prevent cable movement within the conduit.
6. Cable will be installed following the manufacturer's recommendations.
7. Sub-tube couplings will be push-quick connect fittings rated for 200 psi.
8. All sub-tubes will be clear, free of obstructions and usable.
9. Standards:
    a. TIA

C. Inside Plant (ISP) Cable, coupling and accessories.

1. Sub-tube configurations: 19
2. All dielectric, Plenum rated.
3. Incorporate a non-gel water blocking material.
4. The cable must be free of holes, splits, and blisters. The cable jacket must contain no metal elements and must be of a consistent thickness. Cable jackets must be marked with manufacturer's name, sequential foot markings, year of manufacture, and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC).
5. All cable terminations will use a cable grip type device/fitting to prevent cable movement within the conduit.
6. Cable will be installed following the manufacturer's recommendations.
7. Sub-tube couplings will be push-quick connect fittings rated for 200 psi.
8. All sub-tubes will be clear, free of obstructions and usable.
9. Meets following standards:
    a. NFPA 130
    b. IEEE 1202
    c. TIA
    d. UL, UL 1651

D. Fiber Optic Bundles

1. All fibers in the bundle must consist of a doped silica core surrounded by a concentric cladding and all strands must be usable.
2. Single mode bundles available in 6, 12 and 24 strand configurations and as follows:
    a. Core Diameter: 8.3 µm
    b. Cladding Diameter: 125.0 ± 1.0 µm
    c. Core to Cladding Offset: ≤ 0.4 µm
    d. Maximum Dispersion (ps/(nm-km)): ≤ 3.2 @ 1310nm and ≤ 18.0 @ 1550 nm
    e. Cladding must be color coded according to EIA/TIA-298, must be uniform, stable across the operating and storage temperature, not subject to fading or sticking together.

f. Meets following standards:
   1) UL, UL listed for use for fire rated cables
   2) ICEA
   3) TIA

T.240.3 METHOD OF CONSTRUCTION

T.240.3.1 GENERAL

A. Provide all installation services and qualified personnel necessary to install, configure, test, and commission the system.

B. Coordinate with others as required by DRPA or its Designee when performing work, to include installation and testing activities.

T.240.3.2 INSTALLATION

A. Install equipment, cable, fiber optic bundles and hardware according to manufacturer's instructions and recommendations.

B. Install cable, conduit, connectors and mounting hardware according to manufacturer's instructions and recommendations; protect the same from damage before, during, and after installation.

C. Cables from the device/equipment to the DRPA Network Switch shall be terminated in a patch panel and shall NOT be a homerun direct cable.

D. Fiber-to-fiber connections are to be made by fusion splicing. Mechanical, chemical or epoxy-type connectors and splices are unacceptable.

E. All cable and conduit shall be installed in compliance with applicable codes, standards, and DRPA requirements.

F. Contractor shall minimize the disturbance of existing ceilings, conduits, cabling, etc.

G. Do not exceed manufacturer's recommended maximum pulling tensions and conduit/cable bending radius.

H. Install exposed cables and conduits parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

I. Support cables according to manufacturer's requirements, applicable codes, and the technical requirements of these Specifications.

J. Ground and bond all applicable cables, equipment, and devices in accordance with NFPA 70 (NEC).

K. Identify cables and conduits at each end to indicate cable/conduit ID, system, and connecting point.

T.240.3.3 LABELING

A. The requirements labeling shall provide the Contractor with guidelines on Fiber Optic Communications System cabinet and cable labeling.
   1. Cables will be labeled at each enclosure.
      a. Labels shall be high strength laminated and manufactured for extreme environmental conditions with respect to UV, temperature and humidity. Labels should adhere to all types of surfaces. Text shall be bold, legible and fade-resistant. Label types: bands and flags are acceptable.
      b. Each component shall be labeled with an identifier which corresponds to the interconnection diagram.
      c. Cables; in general will be labeled at both ends. The information on each cable end shall indicate the far end termination.

   2. Enclosures
      a. Each enclosure will be labeled with a black phenolic engraved plastic laminate tag with white lettering.

T.240.4 FIBER OPTIC TESTING

A. All fiber optic strands will be tested in three stages:
   1. At the factory prior to shipment.
   2. At the site prior to installation
   3. After installation and splices and terminations are completed.

B. All onsite testing shall be coordinated with and witnessed by representatives of DRPA and/or the DRPA's representative.

C. The Contractor will submit a testing plan for DRPA or its Designee's approval. After test plan is approved, provide at least ten (10) working days' notice prior to all tests to permit the DRPA or its Designee to observe each test. Upon completion of the cable installation, splicing, and termination, the Contractor must test all fibers for continuity, events above 0.30 dB, optical return loss, and total attenuation of the cable in both directions. The test procedure is as follows:
   1. A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter must conduct the installation test. The Technician is directed to conduct the test

using the Standard Operating Procedure as defined by the manufacturer of the test equipment.

a. The method of connectivity between the OTDR and the cable must be a factory patch cord of a length equal to the "dead zone" of the OTDR. Optionally, the Technician can use a factory "fiber box" of 100 meters minimum with no splices within the box. The tests must be conducted at 1310 and 1550 nm and in both directions for each fiber optic strand within the cable.

2. At the completion of the test, the Contractor must provide documentation of the test results to the Engineer. The test documentation must be bound and include the following:
   a. Cable & Fiber Identification
   b. Cable ID
   c. Cable Location - begin and end point
   d. Fiber ID, including tube and fiber color
   e. Operator Name
   f. Date & Time
   g. Setup Parameters
   h. Wavelength
   i. Pulse width (OTDR)
   j. Refractory index (OTDR)
   k. Range (OTDR)
   l. Scale (OTDR)
   m. Test Results

3. OTDR TEST
   a. Total Fiber Trace
   b. Splice Loss/Gain
   c. Events > 0.10 dB
   d. Measured Length (Cable Marking)
   e. Total Length (OTDR)
   f. Traces must be provided on a CD/DVD in PDF format.

4. OPTICAL SOURCE
   a. Total Attenuation
   b. Attenuation (dB/km)

5. OPTICAL RETURN LOSS (ORL)
   a. ORL (dB) > 32 dB

D. A summary of the test results must be provided in tabular form. The following must be the criteria for the acceptance of the cable:

1. The test results must demonstrate that the attenuation (dB/km loss) does not to exceed +3% of the factory test or 1% of the cable's

published production loss. The error rate for the test equipment will be taken into account.

2. No event may exceed 0.30 dB. If any event is detected above 0.30dB, the Contractor must replace or repair that event point.
3. The total dB loss of the cable, less events, must not exceed the manufacturer's production specifications of 0.5 dB/km at both 1310 and 1550 nm.
4. If the total loss exceeds these specifications, the Contractor must replace or repair that cable run at the Contractor's expense, including labor and materials.
5. If the ORL is less than 32 dB then the Contractor will determine and repair the defect for each strand.

T.240.4.1 COMPONENT FAILURES

A. Any component that fails to meet the requirements of this specification will be replaced at the Contractor’s expense.

B. Repairs are acceptable only with the DRPA or its Designee’s sole approval.

END OF SECTIONS T.240-242

SECTION T.243 ITS SYSTEM, COMPLETE POWER SUPPLY

T.243.1 GENERAL

T.243.1.1 DESCRIPTION OF WORK

This work is furnishing, installing, coordinating, erecting, and wiring the complete power supply system, including the electrical power and distribution system at the ITS device locations as indicated on the drawings, as specified herein and as directed by the Engineer.

This work shall include testing the electrical system.

T.243.1.2 QUALITY ASSURANCE

A. Conform to the following:

1. Contract Drawings;

2. The latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards;

3. NEMA Standards Publications, TS4-2005;

4. Pennsylvania Department of Transportation Specifications, Publication 408, 2016, Change No.5, Sections 910, 954.3, 1101.08, 1101.11, 1104.05, and 1201.

B. All work shall be performed in accordance with the latest edition of the National Electric Code (NEC). The Contractor shall be fully responsible for selection of proper type and method of wiring and conduit as necessary to suit system, equipment and code requirements.

T.243.1.3 SUBMITTALS

A. At least ten (10) days before beginning the installation, submit to the DRPA for approval, the Manufacturer's printed product information indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

B. At least ten (10) days before beginning the installation, Submit shop drawings showing cabinet dimensions, wiring schematics, and details of the grounding system to the Engineer for approval prior to beginning work.

C. Submit all Shop Drawings, Catalog Cuts, and submittals prepared by the Manufacturer for review and approval by the Engineer

D. Prepare shop drawings in accordance with the requirements of the Special Provisions

E. Provide diagram of system power interconnection wiring, broken down into "factory" and "field" wiring

F. Provide one-line diagram of power service requirements for each location, broken down by electronics, illumination and, if present, environmental controls such as heating and ventilation

G. Provide detailed drawings for all equipment and outdoor environmental housings proposed for the System, including physical layout of internal components and proposed mounting or installation locations. Include catalog cuts of any "off-the-shelf" enclosures used

H. Provide catalog cuts for all enclosures, interior switches, circuit breakers, receptacles, heating, cooling, and ventilation equipment, surge protection devices, wiring type and size, light sensing configuration, control equipment, and all other components and materials that provide a complete installation

T.243.2 MATERIALS

T.243.2.1 GROUNDING SYSTEM:

A. Meet the NEC, UL and applicable local codes as well as the IEEE recommendations

B. Provide ¾" x 10' sectional copper clad steel ground rods as specified

C. Provide a grounding ring buried a minimum of six (6) inches below grade

D. Install the ground ring a minimum of 2'-0" away from the foundation / structure

E. Provide No. 2/0 AWG bare stranded copper bare conductor as minimum for interconnection of ground rods if more than one ground rod is used. Provide exothermic welding.

F. Provide No. 4 AWG insulated copper conductor as grounding electrode conductor between ground bus bar inside the Service Entrance Safety Switch as well as a connection to base of metal structure, if applicable.

G. Make all connections using exothermic welding process

T.243.2.2 CONDUCTORS:

A. Provide conductors that are UL-listed, provided with THHN/THWN (dual rated) type insulation, insulated phase and equipment ground conductors for general purpose use

B. Meet requirements of ICEA S-95-658 (NEMA WC-70), UL 83 for Type THHN/THWN, Fed Spec A-A59544, NEC 2011

C. Provide all conductor markings and color coding per the NEC requirements

T.243.2.3 TRANSFORMERS:

A. Provide a transformer sized as specified.

B. Provide a lockable NEMA 3R rated transformer. The unit must feature a front-accessible compartment with high and low voltage connectors.

C. Supply a transformer with the following ratings:

1. Single phase

2. Primary Voltage as indicated on the Contract Drawings

3. Secondary Voltage as Specified on the Contract Drawings

4. 60 Hertz

5. Two (2) 5% full capacity taps (min)

6. Wall-mounted NEMA 3R enclosure, UL listed

D. Mount transformer as follows:

1. For 5KVa or less, on device cabinet. Provide stainless steel mounting bolts, nuts, washers, and lock washers.

2. For greater than 5KVa, on standalone pedestal. Provide a hot-dipped galvanized steel mounting post and unistrut. Provide stainless steel mounting bolts, nuts, washers, and lock washers.

T.243.2.4 FUSES

A. Provide Class RK5 time delay, UL-listed, 250V, 200KA I.R. ratings, current limiting fuses and sizes as specified.

T.243.2.5 SURGE PROTECTION:

A. Provide Type 2 SPD on the secondary side of the main circuit breaker inside the ITS Control Cabinet with minimal lead length as specified.

B. Provide Type 2 Surge Protection device (SPD) as described in Article 285 of the NEC, and UL-listed and labeled to UL 1449, 3rd edition. SPD is to be posted at UL.COM, under UL Category Code VZCA

C. Provide SPD that is UL labeled with 20KA I-nominal (In)

D. Provide SPD that equals or exceeds 80KA per phase with maximum protection rating of 700V for modes of protection of Line to Neutral (L-N), Line to Ground (L-G), and Neutral to Ground (N-G).

E. Provide SPD short circuit / fault current rating (SCCR) that equals or exceeds 50KA

F. UL 1449, 3rd Edition, listed Maximum Continuous Operating Voltage (MCOV) for 120/240V system will be 150V for Line-to-Neutral (L-N), Line to Ground (L-G), and Neutral to Ground (N-G)

G. Provide SPD that includes directly connected Thermally Protected Metal Oxide Varistors (MOV)

H. Provide SPD in compliance with IEEE C62.45, C62.41.1, and C62.41.2 rated for -40 to 185 degrees F ambient temperature and equipped with status indication light

T.243.2.6 CIRCUIT BREAKERS:

A. Provide enclosed thermal magnetic molded case circuit breakers of the types, sizes and quantities as specified.

B. Provide the breakers and all components that are designed, manufactured and tested in accordance with the latest UL and NEMA applicable standards including UL 489, NEMA AB-1, NEMA 250

C. Provide circuit breakers that have a quick-make, quick-break over center toggle type mechanism and a position between “ON” and “OFF” when tripped automatically

D. Ensure that all poles open simultaneously in the multiple pole circuit breakers in the event of overload or short circuit currents

E. Provide circuit breakers that have a minimum rating of 10KAIC as specified

T.243.3 METHOD OF CONSTRUCTION

A. Furnish, install, and test all electrical cables, components and subsystems from

B. Fully and completely test all electrical cables, conductors, components and subsystems at a minimum, but not limited to the following:

1. Continuity
2. Open and Shorts
3. Terminal connection testing
4. Reversed/crossed pairs

C. Use appropriate test equipment that ensures proper operations and performance for all connections.

D. Do not begin electrical service until the field equipment (Control Cabinet, CCTV camera, VMS, VSL, etc.) is installed and ready for field configuration and setup.

E. Upon completion of installation of the grounding and bonding systems, ensure that the overall resistance of the grounding system does not exceed the maximum total resistance described in the NEC and recommended by the IEEE

F. Use three (3)-point measurements for measuring resistance to ground of ground rods

G. Maintain earth ground resistance at 25 Ohms or less, in accordance with manufacturer requirements.

H. Paint all equipment as specified

I. Provide Equipment that is Type UV coated to minimize maintenance

J. Before starting Construction, verify existing drainage/utility lines.

END OF SECTION T.243

SECTION T.244 VARIABLE MESSAGE SIGN SYSTEM, WALK-IN

T.244.1 GENERAL

T.244.1.1 DESCRIPTION OF WORK

This work shall consist of furnishing, installing, integrating into the existing Variable Message Sign (VMS) System, and testing a VMS System consisting of six (6) signs and sign controllers, all associated individual units, components, software modules, cabling, and connectors as shown on the drawings, as indicated herein and as directed by the Engineer.

This work shall include testing the system in accordance with Section T.250.

This work shall include training DRPA personnel in accordance with Section T.260.

VMS Locations:

VMS S-4 EB	Sign Structure S-4, Eastbound at STA 66+80
VMS S-10 EB	Sign Structure S-10, Eastbound at STA 110+35
VMS S-14 EB	Sign Structure S-14, Eastbound at STA 132+75
VMS S-16 EB	Sign Structure S-16, Eastbound at STA 143+90
VMS S-16 WB	Sign Structure S-16, Westbound at STA 143+90
VMS S-17 EB	Sign Structure S-17, Eastbound at STA 149+00

T.244.1.2 QUALITY ASSURANCE

A. Conform to the following:

1. Contract Drawings;

2. The latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards;

3. NEMA Standards Publications, TS4-2005;

4. Pennsylvania Department of Transportation Specifications, Publication 408, 2016, Change No.5, Sections 1201, 1230.2, and 1230.3.

B. All work shall be performed in accordance with the latest edition of the National Electric Code (NEC). The Contractor shall be fully responsible for selection of proper type and method of wiring and conduit as necessary to suit the system, equipment and code requirements.

T.244.1.3 SUBMITTALS

A. At least ten (10) days before beginning the installation, submit to the DRPA for approval, the Manufacturer's printed product information indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

B. At least ten (10) days before beginning the installation, Submit shop drawings showing case dimensions, wiring schematics, and details of the variable message sign to the Engineer for approval prior to beginning work.

C. At least ten (10) days before beginning any installation work, submit to the DRPA for approval, an Installation Plan detailing the sequence of VMS installations. Currently there are six (6) Blank-Out-Signs (BOS) in the eastbound direction on structures S-11, S-13, S-14, S-15, S-16, and S-17. Within the Installation Plan sequence of construction ensure that at least four (4) eastbound locations, both existing BOS and new VMS, are operational at any given time during the project.

D. For acceptance of the VMS system by the Authority after installation, submit certification that the variable message signs conform to the specified requirements, have been tested for proper operation and are capable of providing the desired message when the appropriate circuits are energized.

E. Provide a point-by-point (section-by-section) compliance checklist as part of the VMS submittal to demonstrate full compliance with NEMA TS4-2005 and Section 1230 as well as these Project Special Provisions.

F. Submit all Shop Drawings, Catalog Cuts, and submittals prepared by the Sign Manufacturer for review and approval by the Engineer

G. Prepare and submit shop drawings for the fabrication and installation of the VMS

H. Prepare shop drawings in accordance with the requirements of the Special Provisions

I. Provide System Block Diagram illustrating the interrelationship between the various components including a functional drawing defining the operational configuration of the VMS, the sign controller and all other required control and communications devices

J. Provide diagram of system power and communications interconnection wiring, broken down into "factory" and "field" wiring

K. Provide one-line diagram of power service requirements for each location in

the VMS system, broken down by electronics, illumination and, if present, environmental controls such as heating and ventilation

L. Provide details of LED dimming circuit including drawings for each VMS showing configuration and arrangement of full matrix displays

M. Provide calculations and details for sign enclosure fabrication and mounting sealed by the Contractor's Professional Engineer and approved by the Engineer.

N. Provide mounting details that include conduit connections to signs

O. Provide detailed drawings for all equipment and outdoor environmental housings proposed for the System, including physical layout of internal components and proposed mounting or installation locations. Include catalog cuts of any "off-the-shelf" enclosures used

P. Provide design of ventilation, heating, and cooling systems required for the sign enclosure or any other equipment enclosures

Q. Include in the submittal final ventilation design calculations, sealed by the Manufacturer's Professional Engineer and approved by the Engineer. Demonstrate ventilation design and compliance during worst case environmental scenarios even if the design includes passive / natural convection techniques

R. Provide catalog cuts for VMS enclosure interior switches, circuit breakers, receptacles, heating, cooling, and ventilation equipment, surge protection devices, wiring type and size, light sensing configuration, VMS controller and software, and all other components and materials that provide a complete installation

T.244.2 MATERIALS

A. Each VMS shall be a high resolution, full matrix, color, light emitting diode (LED) based Daktronics Dynamic Message Sign - model number VF2020-96x352-20-RGB with a 20mm pixel pitch and 30-degree LED viewing angle.

B. Provide six (6) fully debugged and fully functional VMS systems, each complete with sign, sign controller, and all associated individual units, components, software modules, cabling, and connectors.

C. Each VMS system must be compatible and in compliance with The National ITS Architecture and latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards.

D. Provide VMS that are walk-in, side-access enclosure signs.

E. Use a separate ITS device field enclosure for housing the VMS Controller for easy access by field maintenance technicians at ground level.

F. Provide fiber optic connection between the VMS Controller in the field device enclosure and the VMS enclosure communications / interface electronics.

G. Provide the proposed VMS Controller with the capability of supporting three (3) lighting sensor inputs along with a temperature probe input.

H. Provide a VMS with each pixel configured / comprised of multiple red, green, and blue LEDs meeting the following specifications:

1. Provide each pixel containing the quantity of discrete LEDs needed to output white colored light at a minimum luminous intensity of Full Color 12,400 candelas per square meter, minimum (white) when operated within the forward current limits as defined.

2. Provide Red LEDs utilizing AllnGaP semiconductor technology and emitting red light that has a peak wavelength of 630 +/- 5 nm, nominal.

3. Provide Green LEDs utilizing InGaP semiconductor technology and emitting green light that has a peak wavelength of 525 +/- 5 nm, nominal.

4. Provide Blue LEDs utilizing InGaN semiconductor technology and emitting blue light that has a peak wavelength of 470 +/- 5 nm, nominal.

5. Provide a high pixel resolution sign with a maximum line spacing/pitch of 20 mm (0.787”) center-center, typical.

6. To ensure uniformity of display and operational life, obtain all LEDs of the same color used to make up a display module from no more than two (2) manufacturing batches or bins.

7. Provide LED display modules having a sufficient refresh rate that prevents flicker for all VMS applications including moving graphics.

I. Submit as part of the contractor’s shop drawings submittal a complete schematic of the display, power, driver, and dimming circuits for approval by the Engineer.

J. Use a current for maximum brightness not to exceed the current used to achieve the rated Mean-Time-Before-Failure (MTBF) specification. Indicate the current used for maximum brightness as part of the shop drawing submittal.

K. Group the LEDs in pixels consisting of discrete LEDs arranged in a continuous

matrix display with individual pixel addressability. Character-based matrix arrangements are not acceptable.

L. Optimize the LED grouping and mounting angle for maximum legibility.

M. Design the power driver circuitry to minimize power consumption.

N. Mount the LED driver electronics on the same board as the LED displays.

O. Ensure that removing any display single display module does not affect the operation of the remaining modules.

P. Protect the LED VMS from degradation due to sunlight. Use a method that does not obstruct the view of the display or reduce the viewing angle below that which an unprotected LED VMS provides.

Q. Submit the method and design of the LED VMS sunlight protection to the Engineer for approval.

R. Use a minimum viewing angle of the LEDs of 30 degrees (nominal) based upon the actual roadway conditions and field of view requirements at each sign location.

S. Obtain from the LED Manufacturer assurance of uniformity and consistency on the LED display face within the 30 degree cone of vision. Inconsistent color shifts or intensity can cause product rejection.

T. Provide LEDs with a minimum lifetime of 100,000 hours of permanent use at an operating temperature of 140 degrees Fahrenheit when driven at the specific forward current used for normal daylight VMS display operation. Clearly demonstrate in the VMS submittals (i.e., actual and/or extrapolated data) and/or discuss how operations over expected extreme operating temperatures and humidity levels impacts LED MTBF/performance (High Temperature Operating Life/HTOL) over extended time periods (percent reduction of light output over time). Provide the performance of the proposed LEDs.

U. As part of the LED Manufacturer's technical specification sheet submittal, denote the specific forward current.

T.244.2.1 VMS ENCLOSURE:

A. Provide a design, by a Professional Engineer registered in the Commonwealth of Pennsylvania, of the VMS enclosure, mounting brackets, lifting eyebolts, materials, and structural design meeting all certifications for safety and in compliance with all Pennsylvania Department of Transportation, national, and local standards.

T.244.2.2 VMS ELECTRICAL AND SURGE PROTECTION:

A. Operate all VMS equipment from the supplied 120/240 volt service, single-phase, 3-wire, 60 Hz. +3 Hz (per NEMA TS4), ground bus, isolated neutral bus, 2-pole main circuit breakers.

B. Provide equipment having transient surge protection devices and automatic power failure and "brownout" recovery

C. Provide all wiring and conduits in accordance with Pennsylvania Department of Transportation specifications and the requirements of the NFPA-70, or any local codes having jurisdiction at the installation site, as specified. Leave no wiring or cable exposed.

D. Provide electrical field connections by barrier type terminal connection blocks in accordance with NEMA Standard Specification No. TS-1

E. Soldering of any field terminal connections is not permitted

F. Identify all terminal block connections, cables and wires with permanent adhesive labels or cable tags secured to the cable with nylon cable ties in all junction boxes, VMS enclosures and ITS cabinets that are non-fading or non-yellowing. Label all circuit boards with the correct silk screen labels that are noted in the schematics to enable maintenance technician troubleshooting.

G. Neatly secure all cables and wires with nylon cable clamps or approved equal, permanently attached to the ITS or HUB cabinet / enclosure using an attachment mechanism approved by the Engineer

H. Provide flexible watertight conduit connections to the VMS enclosures

I. Where a cable or wire passes through a hole or runs along a surface at any point through or on a completed assembly, deburr such holes and/or surfaces and leave void of any sharp edges able to damage the cable or wire passing through or along the surface. Equip all deburred holes with a rubber or plastic grommet

J. However, provide sufficient slack such that any cable or wire end can be cut back, re-stripped and connected at least twice

K. Provide sufficient clearance between each terminal and the housing for all electrical connections in the VMS enclosure and ITS cabinets preventing a leakage path or physical contact under stress

L. Install the lay of the interconnect cables between components such that when the housing door is closed, it does not press against the cables or force the

cables against various components inside the housing.

M. Run all equipment grounds without splices directly and independently to the ground bus

N. Connect the grounding strip directly to the VMS enclosure / housing wall

O. Install surge protection devices in the VMS enclosure and local ITS cabinets to protect the electronics from surges and over voltage situations, such as lightning strikes and power line surges

P. Install a 20A/120VAC duplex receptacle outlet for maintenance purposes within each VMS enclosure

Q. Protect all A.C. power utility receptacle circuit(s) located within the VMS and all associated ITS cabinets with Ground Fault Interrupt (GFI) type devices.

R. Electrically bond all VMS enclosures / panels to the support structure with an electrical bond wire or properly prepared electrical contact points

T.244.2.3 VMS SURGE PROTECTION SYSTEM:

A. Provide Type 2 surge protection devices (SPDs) for AC power feed to the VMS panel in accordance with T.249 ITS Field Device Enclosure and T.243 ITS System, Complete Power Supply.

B. Provide additional surge protection devices as specified to guard against circuit damage resulting from surges on any “copper” communications lines entering or leaving the enclosure and/or ITS cabinet.

C. Provide a fiber drop cable between the VMS controller located in the ITS cabinet and the VMS enclosure.

D. UL-listed, meeting UL 96A, UL 497A/B, NEC 2011, applicable ANSI/IEEE standards

E. Include surge protection device cut-sheets and details in the shop drawings for review and approval by the Engineer prior to procurement and installation of devices

T.244.2.4 PRINTED CIRCUIT BOARDS (PCB):

A. Key printed circuit cards and cable connectors to prevent insertion into incorrect locations

B. Provide all printed circuit boards manufactured with the proper amount of

copper trace accordance with IPC standards and double sided with plated through holes (where through hole devices are installed)

C. Manufactured with woven FR4 fiberglass material and proper amount of copper trace accordance with IPC standards

D. Provide gold plated connectors and connector fingers. Provide a moisture proof conformal coating for each board

T.244.3 METHOD OF CONSTRUCTION

A. Provide each VMS sign with a new sign structure and foundation in accordance with the project plans and Pennsylvania Department of Transportation design standards.

B. Install the VMS field equipment on the noted structures in accordance with the manufacturer's requirements, the Pennsylvania Department of Transportation's Standard Plans, and the project specifications.

C. Provide a Daktronics Engineer on-site during installation/erection of each VMS sign for technical support.

D. Provide installation/erection plans for approval by the Engineer prior to installation.

E. Install the power, control, and communications functions separately, external to each sign.

F. Mount each sign controller in the field device enclosure. Mount each controller in a standard 19-inch rack.

G. Install all interconnection cables inside the conduits that run between each sign controller cabinet and the sign support structure and within the sign support structure itself.

H. Prepare final "as-built" drawings and/or diagrams showing in detail the final configurations at each field location and the WWB Administration Building Police Radio Room.

I. The manufacturer shall provide any applicable system settings.

J. Integrate the six (6) new VMS into the existing VMS System to provide a fully functional VMS System along the WWB Corridor.

K. Test the system in accordance with Section T.250.

L. Coordinate VMS Sign messaging with the Vendor, the Engineer, and the DRPA.

M. Train the DRPA personnel in accordance with Section T.260.

T.244.3.1 LABELING AND MARKING:

A. Insert a block diagram of all components illustrating all connectors and connections interconnecting the components, wiring diagrams and schematic drawings of all circuits, in a re-sealable weather-resistant pocket permanently mounted on the inside of an accessible door in the ITS cabinet and the VMS enclosure.

B. Label all devices, components, cables and wires with permanently attached labels designed for use in the intended environment

C. Mark all electronic parts (such as capacitors, resistors and integrated circuits) either with the characteristics of the part or with an industry standard part number

D. Label custom parts, such as Read Only Memories, to identify the information, the revision level, date and checksum of the information stored

E. Clearly label all printed circuit card cages, all slots within the cages and all printed circuit card interconnection cables

T.244.3.2 MANUFACTURER WARRANTY

A. The Manufacturer shall warrant to the DRPA that all materials and equipment furnished under this Contract shall be new unless otherwise specified and approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.

B. All work not conforming to these standards may be considered defective.

C. The Manufacturer shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.

D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.

E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

F. If, during final inspection by the DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the DRPA, a second inspection shall be made following correction, and the one (1) year guarantee shall run from the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in writing.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

H. The DRPA reserves the right to immediately affect both temporary and permanent repairs, or arrange for others to affect such repairs, if the DRPA determines that an emergency situation is presented by the Contractor's defective work or materials. Such temporary and permanent repairs shall be at the expense of the Contractor, and the Contractor agrees that in such event the DRPA shall be reimbursed by the Contractor or by its surety.

END OF SECTION T.244

SECTION T.245 VARIABLE SPEED LIMIT SIGN SYSTEM, FRONT ACCESS

T.245.1 GENERAL

T.245.1.1 DESCRIPTION

This work shall consist of furnishing, installing, and testing of seven (7) Front Access LED Variable Speed Limit (VSL) Signs on new sign structures on the PA Approach to the Walt Whitman Bridge and the integration of the VSL Signs into the existing traffic control system and graphical user interface (GUI) at the Ben Franklin Bridge Administration Building Police Radio Room to provide a fully operational and complete VSL Sign System on the Walt Whitman Bridge Corridor as indicated on the drawings and specified herein.

This work involves the following Structures:

S-10: One (1) Eastbound VSL sign and One (1) Westbound VSL sign
S-14: One (1) Eastbound VSL sign and One (1) Westbound VSL sign
S-17 EB: One (1) Eastbound VSL sign
S-17 WB: Two (2) Westbound VSL sign

This work shall include testing the system in accordance with Section T.250.

This work includes training DRPA personnel in accordance with Section T.260.

T.245.1.2 QUALITY ASSURANCE

A. Conform to the following:

1. Contract Drawings;
2. National Transportation Communication for ITS Protocol (NTCIP) 1203;
3. NEMA Standards Publications;
4. Pennsylvania Department of Transportation Specifications, Publication 408, 2016 Edition, Change No. 5. References to the “Department” shall be interpreted to mean “DRPA or its Designee”.
5. Pennsylvania Department of Transportation Publication 35 (Bulletin 245), latest edition. References to the “Department” shall be interpreted to mean “DRPA or its Designee”.
6. Pennsylvania Department of Transportation Publication 245, latest edition. References to the “Department” shall be interpreted to mean “DRPA or its Designee”.
7. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013.

8. Pennsylvania Department of Transportation Specifications, Publication 647, ITS-1200 Series, March 2013 Edition.

B. Demonstrate that the VSL unit meets the specifications herein to the DRPA WWB Director and DRPA Maintenance personnel in bright sunlight and nighttime conditions for testing and final acceptance of the unit, prior to purchase and delivery.

T.245.1.2 SUBMITTALS

A. Submittals shall be in accordance with the Special Provisions.

B. Submit detailed shop drawings and Manufacturer cut-sheets to the Engineer for review and acceptance. Do not purchase or commence any fabrication work until the shop drawings and cut-sheets are approved.

C. Submit pre-build technical information, including product specifications and data sheets for each item used in the VSL sign and mounting attachments (LED to sign, and VSL sign to existing/new gantry).

D. Submit quality assurance documents and manufacturer qualifications and warranty as outlined in this document.

E. Submit an installation procedure and plans for the DRPA's use showing all brackets, attachment details, and mounting hardware needed to install the VSL signs to the locations as indicated.

F. Submit one (1) complete VSL sign unit for review and approval by the DRPA prior to the purchase of the remaining units. The sign to be submitted will be one of the seven (7) total signs required for the project.

G. Submit an Operational Test Plan for review and approval by the DRPA.

T.245.2 MATERIALS

A. In accordance with Pennsylvania Department of Transportation Specifications, Publication 408, 2016 Edition, Change No. 5, Section 948.2, the Contract Drawings, and as follows:

B. Each VSL shall be a front access, high intensity, full color, light emitting diode (LED) based Daktronics Variable Speed Limit sign - model number VS-5229-2-18-W.

T.245.2.1 GENERAL

A. All materials furnished, assembled, fabricated or installed under this item will be

new, corrosion resistant and in strict accordance with this specification.

B. The VSL signs supplied shall be single self-contained units requiring connections to power and communications.

1. A VSL sign that has a separate controller will not be accepted.

C. The LED module manufacturer is to have a record of 5 years minimum experience manufacturing LED displays. The pre-build technical submittal must provide a resume of the company's previous experience in the public sector in the provision of LED displays.

D. The VSL sign system(s) provided for this contract must comply with the following specification and standards. If no revision date is specified, the most recent revision of the standard applies.

T.245.2.2 VARIABLE SPEED LIMIT (VSL) SIGN REQUIREMENTS

A. The VSL system will utilize the existing graphical user interface (GUI) from the existing supervisory control and data acquisition SCADA system located at the Police Central Communications (PCC) room at the Benjamin Franklin Bridge and backup PCC at the Walt Whitman Bridge. The VSL sign will interface with the current Tri-M SCADA systems; the VSL signs will be connected to the SCADA system via dry contact closures.

B. The VSL unit shall include, but is not limited to:

1. A 60" x 72" MUTCD R2-1 extruded aluminum static sign in accordance with the FHWA Manual of Uniform Traffic Control Devices (MUTCD Rev. 2009, Revisions 1 and 2);

2. Full matrix and full color Light Emitting Diode (LED) module(s) capable of displaying 18-inch white digits (Amber will not be permitted) that approximate the E-series fonts for the following two (2) character messages: 25, 35, and 45;

3. VSL sign controller;

4. Power and serial communications connections

5. A dry-contact relay enclosure, to be supplied by others, that will interface between the VSL and the DRPAs SCADA system.

6. Sun visor,

7. Contrast shields,

8. Internal wiring,

9. Terminal strips for interconnecting wire, photo sensor, fans, and surge protection as required by the sign manufacturer.

10. Photo sensor controls capable of communicating with the sign controller to monitor and control brightness level. An 'over-brightness' level of operation in fog or intense sunlight is required.

C. Sign mounting brackets shall be provided for mounting the VSL sign to the bridge gantry structures.

T.245.2.3 LED DISPLAY MODULE REQUIREMENTS

Each VSL sign is to include an LED display module with front access (with the ability to provide DRPA personnel access for maintenance without the need for a lane closure) for all LED display electronics, environmental control equipment, air filters, wiring, and other internal components.

The LED module shall be housed in a NEMA 3 enclosure equipped with water drainage devices.

The LED module shall be able to display speed limits composed of any combination of one or two numeric digits. The LED characters shall be capable of flashing any combination of numerals. Characters shall be legible within a distance range of 2450 feet to more than 1,000 feet from the module display face.

Optical and Electrical Characteristics:

1. LED and Pixel Characteristics - Provide high-quality LEDs providing diodes with a 30-degree viewing angle with a white color.

2. The LED module shall consist of a full matrix format. Each pixel shall consist of a high-intensity LED cluster. The LED lamps shall run at a minimum voltage to provide extended life.

3. Mount the LEDs directly to a printed circuit board at a maximum spacing of 35 millimeters that can be easily replaceable and individually removable using conventional electronics repair methods.

4. Protect the LEDs from the outside environmental conditions, including moisture, snow, ice, wind, dust, dirt, and UV rays.

5. Provide a built in light sensor for brightness control. The LED module controller shall continuously monitor the light sensors and adjust the LED display matrix intensity to a level that creates a legible message. Brightness control must be able to be returned to automatic from the module rear panel. Wireless control is not acceptable.

Power Requirements - The voltage to the LED modules and associated electronics must

not exceed 12 VDC.

Electrical components and circuits must be designed, wired, and color-coded per the National Electric Code.

Environmental Behavior - Provide LEDs capable of operating without any decrease in performance over an ambient temperature range of -30 degrees F to 165 degrees F, with a relative humidity of up to 95%.

Product Electrical Safety – The LED module and all associated equipment and enclosures must be listed by the Underwriters Laboratories (UL) and must bear the UL mark on the outside of the enclosure. The module is to be listed as conformant to UL 48 Standard for Electric Signs and UL 50 Enclosures for Electrical Equipment.

Radio Frequency Emissions – All equipment must be designed in accordance with Federal Communications Commission (FCC) Part 245, Subpart B as a "Class A" digital device.

The LEDs shall be rated by the LED manufacturer to have a minimum lifetime of 100,000 hours of continuous operation while maintaining a minimum of 70% of the original brightness.

LED modules are to present a clean and neat appearance as specified in the general requirements. Poor workmanship will be cause for rejection of the sign. Have the complete sign housing of the LED module designed and manufactured in-house by the LED module manufacturer.

Provide LED modules with no degradation of performance including visibility or legibility of the display due to continuous vibration caused by wind, traffic or other factors.

Provide LED modules with no degradation of performance due to the presence of power transients or electromagnetic fields, including those created by any components of the system. Provide LED modules that do not conduct or radiate signals that adversely affect other electrical or electronic equipment including, but not limited to, other control systems, data processing equipment, audio, and radio and industrial equipment.

All electronic components, except printed circuit boards, must be commercially available, easily accessible, replaceable and individually removable using conventional electronics repair methods.

Provide all electronic assemblies that meet or exceed IPC 610A workmanship standards.

T.245.2.4 VSL SIGN CONTROLLER REQUIREMENTS

A VSL sign controller is to be provided at each VSL location to allow for remote control of the sign LED module display.

The controller shall be capable of receiving commands from a Master Computer (MC) and the local panel, and using those commands to control the sign.

The controller is to be individually addressable by the Master Computer (MC) via the communications system for the control monitoring.

The controller shall be capable of monitoring its own electronics status (Printed Circuit Boards (PCB) and modules) and report any status changes, including, but not limited to the status of all LEDs on the sign.

The controller shall be capable of controlling brightness level by photo sensor controls located in the VSL sign.

The controller shall be capable of displaying a single static message or flashing message. The "message" refers to the actual speed (numerical value) being displayed.

The controller shall be capable of blanking the sign, or placing the sign in neutral condition following termination of a displayed message.

Under communications or power failure, the controller shall contain a fail-safe mechanism to automatically blank the sign or post a default message that is selectable.

Environmental Behavior - Provide a controller capable of operating without any decrease in performance over an ambient temperature range of -30 degrees F to 165 degrees F, with a relative humidity of up to 95%.

The VSL sign controller is to be incorporated within the VSL sign housing.

Provide lightning protection and termination for all communication cables.

Label all provided cabling individually and clearly with permanent markings.

T.245.2.5 COMMUNICATIONS REQUIREMENTS

The communication protocol shall follow the NTCIP standards as specified in NEMA standard TS 3.6 or its latest version.

Data transmission rate shall be configurable to select from 1200, 2400, 4800, or 9600 bps and set to the rate of 9600 bps.

Exchanges between the VSL sign controller and Master Computer (MC) are to be made only upon a Master Computer request inviting the VSL sign controller to send (select) or receive (poll) data.

T.245.2.6 CONTROL SOFTWARE REQUIREMENTS

Provide any control software from the VSL sign manufacturer to support VSL sign control, monitoring, maintenance, and diagnostics functions from the DRPA's SCADA system located at both the Benjamin Franklin Bridge PCC and the back-up Walt Whitman Bridge PCC and locally at the sign site location.

Control software provided is to be configured for the devices included in this contract.

T.245.3 CONSTRUCTION

In accordance with the Specifications, the Contract Drawings, Pennsylvania Department of Transportation Specifications Publication 408, 2016 Edition, Change No. 5., Publication 212, Publication 213/June 2014 Edition, Publication 236/ 2013 Edition, Change No.1, Publication 647/March 2013 Edition, Publication 697, and as follows:

Verify all dimensions in the field required to satisfactorily complete the work.
All existing structure mounts to be field verified by the contractor and/or sign vendor.

Install VSL signs at each field site and utilize/upgrade existing structure mounts to gantries, conduit, and cables as necessary between the VSL sign controller, and the gantry control cabinet for operation of the VSL sign.

As-built plans are not available for the mast arm sign mountings.

Prior to installation, demonstrate that one (1) VSL sign unit meets the specifications herein, to the satisfaction of the DRPA Walt Whitman Bridge Director and DRPA Maintenance personnel in bright sunlight and night time conditions. This unit, if accepted, will be considered one (1) of the seven (7) units required under this contract.

The VSL sign manufacturer shall provide on-site technical installation expertise on the project as needed. The contractor shall install the modules as directed by the manufacturer, tilting the units, as needed, toward the roadway per manufacturer's recommendations, to achieve maximum visibility from the roadway.

Install the SCADA, power, control, and communications functions that are to supply the VSL signs.

Utilize Tri-M Building Automation Systems for VSL integration into the existing Supervisory Control and Data Acquisition (SCADA) system, as noted in T.259 Coordination with Tri-M, and as directed by the Engineer.

Tri-M Point of Contact:

- Mr. Bob Curry: 610-444-1002 ; BCurrie@Tri-Mgroup.com

Install low voltage (power) and extra low voltage (control) cables to operate the VSL sign. The cables shall be installed in continuous, un-spliced lengths between the sign case and the controller unit, and power supply in the new ground-mounted controller cabinet. Provide sufficient slack to ensure that the connections to the controller and the power source will be possible without the need to add or splice any cables.

Install all power and communication cables to interface the VSL signs with the existing supervisory control and data acquisition SCADA system. Coordinate these installations with the VSL sign manufacturer and Tri-M.

The Contractor shall be responsible for the "as-built" drawings and/or diagrams showing in detail the final configurations at each field location and the Police Central Communications (PCC).

Perform all work in accordance with the traffic staging indicated on the Maintenance and Protection of Traffic Plans.

Repair any damage caused to portions of the existing structure to remain to the satisfaction of the Engineer at no cost to the Authority.

Provide required conduit sleeves internal to sign structure and communication cables and coordinate the installation of power and communication cables with the sign manufacturer and the Engineer.

Coordinate installation of power, conduits and ITS devices with the applicable specifications, the Engineer and the utility company.

T.245.3.1 MANUFACTURER WARRANTY

A. The Manufacturer shall warrant to the DRPA that all materials and equipment furnished under this Contract shall be new unless otherwise specified and approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.

B. All work not conforming to these standards may be considered defective.

C. The Manufacturer shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.

D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.

E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding

correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

F. If, during final inspection by the DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the DRPA, a second inspection shall be made following correction, and the one (1) year guarantee shall run from the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in writing.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

H. The DRPA reserves the right to immediately affect both temporary and permanent repairs, or arrange for others to affect such repairs, if the DRPA determines that an emergency situation is presented by the Contractor's defective work or materials. Such temporary and permanent repairs shall be at the expense of the Contractor, and the Contractor agrees that in such event the DRPA shall be reimbursed by the Contractor or by its surety.

END OF SECTION T.245

SECTION T.246 LANE USE CONTROL SIGNAL SYSTEM, FRONT ACCESS

T.246.1 GENERAL

T.246.1.1 DESCRIPTION OF WORK:

This work shall consist of furnishing, installing, integrating into the existing Lane Use Control Signal (LUCS) System, and testing a LUCS System consisting of eleven (11) signs and three (3) manufacturer's power and control enclosures including all associated individual units, components, software modules, cabling, and connectors as shown on the drawings, as indicated herein and as directed by the Engineer.

This work involves the following Structures:

New S-17 EB: Three (3) Eastbound LUCS
Existing S-23 EB: Four (4) Eastbound LUCS
Existing S-24 EB: Four (4) Eastbound LUCS

This work shall include testing the system in accordance with Section T.250.

This work shall include training DRPA personnel in accordance with Section T.260.

T.246.1.2 QUALITY ASSURANCE

A. Conform to the following:

1. Contract Drawings;

2. The latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards;

3. NEMA Standards Publications, TS4-2005;

4. Pennsylvania Department of Transportation Specifications, Publication 408, 2016, Change No.5, Sections 24601, 1230.2, and 1230.3.

B. All work shall be performed in accordance with the latest edition of the National Electric Code (NEC). The Contractor shall be fully responsible for selection of proper type and method of wiring and conduit as necessary to suit system, equipment and code requirements.

T.246.1.3 SUBMITTALS

A. At least ten (10) days before beginning the installation, submit to the DRPA for approval, the Manufacturer's printed product information indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

B. At least ten (10) days before beginning the installation, Submit shop drawings showing case dimensions, wiring schematics, and details of the variable message sign to the Engineer for approval prior to beginning work.

C. For acceptance of the LUCS system by the Authority after installation, submit certification that the lane use control signals conform to the specified requirements, have been tested for proper operation and are capable of displaying the desired symbol when the appropriate circuits are energized.

D. Provide a point-by-point (section-by-section) compliance checklist as part of the LUCS submittal to demonstrate full compliance with NEMA TS4-2005 and Section 1230 as well as these Project Special Provisions.

E. Submit all Shop Drawings, Catalog Cuts, and submittals prepared by the Sign Manufacturer for review and approval by the Engineer

F. Prepare and submit shop drawings for the fabrication and installation of the LUCS

G. Prepare shop drawings in accordance with the requirements of the Special Provisions

H. Provide System Block Diagram illustrating the interrelationship between the various components including a functional drawing defining the operational configuration of the LUCS, the sign controller and all other required control and communications devices

I. Provide diagram of system power and communications interconnection wiring, broken down into “factory” and “field” wiring

J. Provide one-line diagram of power service requirements for each location in the LUCS system, broken down by electronics, illumination and, if present, environmental controls such as heating and ventilation

K. Provide details of LED dimming circuit including drawings for each LUCS showing configuration and arrangement of full matrix displays

L. Provide calculations and details for sign enclosure fabrication and mounting sealed by the Contractor’s Professional Engineer and approved by the Engineer.

M. Provide mounting details that include conduit connections to signs

N. Provide detailed drawings for all equipment and outdoor environmental housings proposed for the System, including physical layout of internal

components and proposed mounting or installation locations. Include catalog cuts of any "off-the-shelf" enclosures used

O. Provide design of ventilation, heating, and cooling systems required for the sign enclosure or any other equipment enclosures

P. Include in the submittal final ventilation design calculations, sealed by the Manufacturer's Professional Engineer and approved by the Engineer. Demonstrate ventilation design and compliance during worst case environmental scenarios even if the design includes passive / natural convection techniques

Q. Provide catalog cuts for LUCS enclosure interior switches, circuit breakers, receptacles, heating, cooling, and ventilation equipment, surge protection devices, wiring type and size, light sensing configuration, LUCS controller and software, and all other components and materials that provide a complete installation

T.246.2 MATERIALS

A. Each LUCS shall be a front access, high-intensity, light emitting diode (LED) based Daktronics Lane Use Control Signal - model number VM-1020-7x10-66-RG.

B. Provide eleven (11) fully debugged and fully functional LUCS signs, each complete with all associated individual units, components, software modules, cabling, and connectors.

C. Each LUCS sign must be compatible and in compliance with The National ITS Architecture and latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards.

D. Provide LUCS that are front access signs.

E. Use a Manufacturer's Power and Control Enclosure, at ground level for easy access by field maintenance technicians, for each of the three (3) separate gantry location as noted on the plans.

F. Provide fiber optic connection between the LUCS Controller in the Power and Control Enclosure and the LUCS sign communications / interface electronics.

G. Provide a LUCS with each pixel configured / comprised of multiple red, green, and blue LEDs meeting the following specifications:

1. Provide each pixel containing the quantity of discrete LEDs needed to output white colored light at a minimum luminous intensity of Full Color 12,400

candelas per square meter, minimum (white) when operated within the forward current limits as defined.

2. Provide Red LEDs utilizing AllnGaP semiconductor technology and emitting red light that has a peak wavelength of 650 +/- 5 nm, nominal.

3. Provide Green LEDs utilizing InGaP semiconductor technology and emitting green light that has a peak wavelength of 525 +/- 5 nm, nominal.

4. Provide Blue LEDs utilizing InGaN semiconductor technology and emitting blue light that has a peak wavelength of 470 +/- 5 nm, nominal.

5. Provide a high pixel resolution sign with a maximum line spacing/pitch of 20 mm (0.787") center-center, typical.

6. To ensure uniformity of display and operational life, obtain all LEDs of the same color used to make up a display module from no more than two (2) manufacturing batches or bins.

7. Provide LED display modules having a sufficient refresh rate that prevents flicker for all LUCS applications including moving graphics.

H. Submit as part of the contractor's shop drawings submittal a complete schematic of the display, power, driver, and dimming circuits for approval by the Engineer.

I. Use a current for maximum brightness not to exceed the current used to achieve the rated Mean-Time-Before-Failure (MTBF) specification. Indicate the current used for maximum brightness as part of the shop drawing submittal.

J. Group the LEDs in pixels consisting of discrete LEDs arranged in a continuous matrix display with individual pixel addressability. Character-based matrix arrangements are not acceptable.

K. Optimize the LED grouping and mounting angle for maximum legibility.

L. Design the power driver circuitry to minimize power consumption.

M. Mount the LED driver electronics on the same board as the LED displays.

N. Ensure that removing any display single display module does not affect the operation of the remaining modules.

O. Protect the LED LUCS from degradation due to sunlight. Use a method that does not obstruct the view of the display or reduce the viewing angle below that which an unprotected LED LUCS provides.

P. Submit the method and design of the LED LUCS sunlight protection to the Engineer for approval.

Q. Use a minimum viewing angle of the LEDs of 30 degrees (nominal) based upon the actual roadway conditions and field of view requirements at each sign location.

R. Obtain from the LED Manufacturer assurance of uniformity and consistency on the LED display face within the 30 degree cone of vision. Inconsistent color shifts or intensity can cause product rejection.

S. Provide LEDs with a minimum lifetime of 100,000 hours of permanent use at an operating temperature of 140 degrees Fahrenheit when driven at the specific forward current used for normal daylight LUCS display operation. Clearly demonstrate in the LUCS submittals (i.e., actual and/or extrapolated data) and/or discuss how operations over expected extreme operating temperatures and humidity levels impacts LED MTBF/performance (High Temperature Operating Life/HTOL) over extended time periods (percent reduction of light output over time). Provide the performance of the proposed LEDs.

T. As part of the LED Manufacturer's technical specification sheet submittal, denote the specific forward current.

T.246.2.1 LUCS ENCLOSURE:

A. Provide a design, by a Professional Engineer registered in the Commonwealth of Pennsylvania, of the LUCS enclosure, mounting brackets, lifting eyebolts, materials, and structural design meeting all certifications for safety and in compliance with all Pennsylvania Department of Transportation, national, and local standards.

T.246.2.2 LUCS ELECTRICAL AND SURGE PROTECTION:

A. Operate all LUCS equipment from the supplied 120/240 volt service, single-phase, 3-wire, 60 Hz. +3 Hz (per NEMA TS4), ground bus, isolated neutral bus, 2-pole main circuit breakers.

B. Provide equipment having transient surge protection devices and automatic power failure and "brownout" recovery

C. Provide all wiring and conduits in accordance with Pennsylvania Department of Transportation specifications and the requirements of the NFPA-70, or any local codes having jurisdiction at the installation site, as specified. Leave no wiring or cable exposed.

D. Provide electrical field connections by barrier type terminal connection blocks

in accordance with NEMA Standard Specification No. TS-1

E. Soldering of any field terminal connections is not permitted

F. Identify all terminal block connections, cables and wires with permanent adhesive labels or cable tags secured to the cable with nylon cable ties in all junction boxes, LUCS enclosures and ITS cabinets that are non-fading or non-yellowing. Label all circuit boards with the correct silk screen labels that are noted in the schematics to enable maintenance technician troubleshooting.

G. Neatly secure all cables and wires with nylon cable clamps or approved equal, permanently attached to the ITS or HUB cabinet / enclosure using an attachment mechanism approved by the Engineer

H. Provide flexible watertight conduit connections to the LUCS enclosures

I. Where a cable or wire passes through a hole or runs along a surface at any point through or on a completed assembly, deburr such holes and/or surfaces and leave void of any sharp edges able to damage the cable or wire passing through or along the surface. Equip all deburred holes with a rubber or plastic grommet

J. However, provide sufficient slack such that any cable or wire end can be cut back, re-stripped and connected at least twice

K. Provide sufficient clearance between each terminal and the housing for all electrical connections in the LUCS enclosure and ITS cabinets preventing a leakage path or physical contact under stress

L. Install the lay of the interconnect cables between components such that when the housing door is closed, it does not press against the cables or force the cables against various components inside the housing.

M. Run all equipment grounds without splices directly and independently to the ground bus

N. Connect the grounding strip directly to the LUCS enclosure / housing wall

O. Install surge protection devices in the LUCS enclosure and local ITS cabinets to protect the electronics from surges and over voltage situations, such as lightning strikes and power line surges

P. Install a 20A/120VAC duplex receptacle outlet for maintenance purposes within each LUCS enclosure

Q. Protect all A.C. power utility receptacle circuit(s) located within the LUCS

and all associated ITS cabinets with Ground Fault Interrupt (GFI) type devices.

R. Electrically bond all LUCS enclosures / panels to the support structure with an electrical bond wire or properly prepared electrical contact points

T.246.2.3 LUCS SURGE PROTECTION SYSTEM:

A. Provide Type 2 surge protection devices (SPDs) for AC power feed to the LUCS panel in accordance with Section T.247 ITS Device Field Enclosure and T.241– ITS System - Complete Power Supply.

B. Provide additional surge protection devices as specified to guard against circuit damage resulting from surges on any “copper” communications lines entering or leaving the enclosure and/or ITS cabinet.

C. Provide a fiber drop cable between the LUCS controller located in the ITS cabinet and the LUCS enclosure.

D. UL-listed, meeting UL 96A, UL 497A/B, NEC 2011, applicable ANSI/IEEE standards

E. Include surge protection device cut-sheets and details in the shop drawings for review and approval by the Engineer prior to procurement and installation of devices

T.246.2.4 PRINTED CIRCUIT BOARDS (PCB):

A. Key printed circuit cards and cable connectors to prevent insertion into incorrect locations

B. Provide all printed circuit boards manufactured with the proper amount of copper trace accordance with IPC standards and double sided with plated through holes (where through hole devices are installed)

C. Manufactured with woven FR4 fiberglass material and proper amount of copper trace accordance with IPC standards

D. Provide gold plated connectors and connector fingers. Provide a moisture proof conformal coating for each board

T.246.3 METHOD OF CONSTRUCTION

A. Attach each LUCS sign to an existing or new sign structure in accordance with the project plans and Pennsylvania Department of Transportation design standards.

B. Install the LUCS field equipment on the noted structures in accordance with the manufacturer's requirements, the Pennsylvania Department of Transportation's Standard Plans, and the project specifications.

C. Provide a Daktronics Engineer on-site during installation/erection of each LUCS sign for technical support.

D. Provide installation/erection plans for approval by the Engineer prior to installation.

E. Install the power, control, and communications functions separately, external to each sign.

F. Mount each sign controller in the control cabinet. Mount each controller in a standard 19-inch rack.

G. Install all interconnection cables inside the conduits that run between each sign controller cabinet and the sign support structure and within the sign support structure itself.

H. Prepare final "as-built" drawings and/or diagrams showing in detail the final configurations at each field location and the WWB Administration Building Police Radio Room.

I. The manufacturer shall provide any applicable system settings.

J. Integrate the eleven (11) new LUCS into the existing LUCS System to provide a fully functional LUCS System along the WWB Corridor.

K. Test the system in accordance with Section T.250.

L. Train the DRPA personnel in accordance with Section T.260.

T.246.3.1 LABELING AND MARKING:

A. Insert a block diagram of all components illustrating all connectors and connections interconnecting the components, wiring diagrams and schematic drawings of all circuits, in a re-sealable weather-resistant pocket permanently mounted on the inside of an accessible door in the ITS cabinet and the LUCS enclosure.

B. Label all devices, components, cables and wires with permanently attached labels designed for use in the intended environment

C. Mark all electronic parts (such as capacitors, resistors and integrated circuits) either with the characteristics of the part or with an industry standard part number

D. Label custom parts, such as Read Only Memories, to identify the information, the revision level, date and checksum of the information stored

E. Clearly label all printed circuit card cages, all slots within the cages and all printed circuit card interconnection cables

T.246.3.2 MANUFACTURER WARRANTY

A. The Manufacturer shall warrant to the DRPA that all materials and equipment furnished under this Contract shall be new unless otherwise specified and approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.

B. All work not conforming to these standards may be considered defective.

C. The Manufacturer shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.

D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.

E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

F. If, during final inspection by the DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the DRPA, a second inspection shall be made following correction, and the one (1) year guarantee shall run from

the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in writing.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

H. The DRPA reserves the right to immediately affect both temporary and permanent repairs, or arrange for others to affect such repairs, if the DRPA determines that an emergency situation is presented by the Contractor's defective work or materials. Such temporary and permanent repairs shall be at the expense of the Contractor, and the Contractor agrees that in such event the DRPA shall be reimbursed by the Contractor or by its surety.

END OF SECTION T.246

SECTION T.247 CCTV CAMERA SYSTEM, STRUCTURE MOUNT

T.247.1 GENERAL

T.247.1.1 DESCRIPTION OF WORK:

This work is the furnishing and installing a closed-circuit television (CCTV) system fully integrated into the existing central CCTV system and testing the CCTV System consisting of five (5) new CCTV cameras including all associated individual units, components, software modules, cabling, and connectors as shown on the drawings, as indicated herein and as directed by the Engineer.

This work involves the following Structures:

1. New CM-8718 - WB on Existing Structure S-2
2. New CM-8719 - EB on Structure S-5
3. New CM-8720 - EB on Structure S-9
4. New CM-8721 - EB on Structure S-13
5. New CM-8722 - EB on Structure S-17

This work shall include testing the system in accordance with Section T.250.

This work shall include training DRPA personnel in accordance with Section T.260.

T.247.1.2 QUALITY ASSURANCE

A. Conform to the following:

1. Contract Drawings;

2. The latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards;

3. NEMA Standards Publications, TS4-2005;

4. Pennsylvania Department of Transportation Pennsylvania Department of Transportation Specifications, Publication 408, 2016, Change No.5, Sections 1201 and 1210.

B. All work shall be performed in accordance with the latest edition of the National Electric Code (NEC).

T.247.1.3 SUBMITTALS

A. At least ten (10) days before beginning the installation, submit to the DRPA for approval, the Manufacturer's printed product information indicating material characteristics, performance criteria, product limitations, preparation

requirements and installation procedures.

B. At least ten (10) days before beginning the installation, Submit shop drawings showing case dimensions, wiring schematics, and details of the variable message sign to the Engineer for approval prior to beginning work.

C. For acceptance of the CCTV camera system by the Authority after installation, submit certification that the cameras conform to the specified requirements and have been tested for proper operation.

T.247.2 MATERIALS

A. Provide one (1) type of CCTV camera for all locations:

BOSCH Autodome IP Starlight 7000 HD IP CCTV Camera

B. Provide IP cameras with internal H.264 encoding as specified in Pennsylvania Department of Transportation Publication 408, Section 1210.2 (e).

C. Furnish all hardware specified herein, tools, equipment, cables, materials, supplies, and manufactured articles, and perform all operations and integration of new CCTV elements necessary to successfully construct the CCTV camera system equipment.

D. Provide complete equipment with all individual units, components, software modules, manufacturer-provided software, etc. that is completely compatible with the existing CCTV camera and communications system and fully debugged.

E. Provide all CCTV camera equipment and components compatible with the existing Camera Control System at the DRPA.

T.247.2.1 POWER OVER ETHERNET (POE) INJECTOR:

A. Provide a midspan Power over Ethernet (POE) Injector meeting IEEE 802.3at standards, NEMA TS-2 temperature specifications and approved by the manufacturer for operating the outdoor PTZ camera/dome CCTV assembly

T.247.2.2 CCTV CAMERA CABLES:

A. Submit the proposed cable types to the Engineer for review and approval

T.247.2.3 CAT-6 NETWORK CABLE REQUIREMENTS:

A. Provide and install Cat-6 UTP cabling for IP camera network operations (video and data) and power meeting the following technical specifications as

recommended by the proposed IP Camera manufacturer:

a. 4-pair, 24AWG, solid copper conductors, polyolefin insulation

b. 10 Base-T/TX to 1000 Base-T/TX Ethernet ready

c. Outdoor rated - weather and abrasion resistant PVC jacket

d. Meet TIA/EIA-568-C.2 specifications (full Cat-6 compliance)

e. Modular RJ-45 male connectors equipped with eight (8) gold anodized pins

f. Water-tight connectors and cables for use in outdoor environment

g. Certified and compliant with Cat-6 operations

h. UL-listed

T.247.3 METHOD OF CONSTRUCTION

A. Install CCTV camera system elements as indicated and as recommended by the CCTV camera manufacturer providing a fully functional CCTV camera system.

B. Remove the existing CCTV Camera on Structure S-2 and clean and prepare the existing surface for the new CCTV camera. Notify the Engineer if the existing installation holes are not able to be reused for the new camera. If unusable, plug the holes with a system approved by the Engineer and not in conflict with the new camera installation. Leave the entire surface in a like-new condition.

C Perform all necessary work for incorporating the new CCTV cameras into the existing CCTV camera system.

D. Provide any necessary hardware and/or software which enable the DRPA Operator to change camera set-up parameters.

E. Set up the preset views for each camera as directed by the Engineer. Modify the existing CCTV camera system software as necessary. If required, submit a list of the proposed preset views and their proposed titles to the Engineer for review, revisions, and approval. Work from the approved list.

F. For each CCTV camera establish a proposed system of pan and tilt zones and a proposed title for each zone, in accordance with the existing titling requirements as established by the Engineer.

G. Treat dome module with a Manufacturer approved and Engineer approved polymer spray to enhance rainwater sheeting and runoff.

T.247.3.1 CCTV CAMERA ASSEMBLY:

A. Mount the dome camera housing to the pole as shown on the plans and as recommended by the Manufacturer.

B. Provide CCTV camera assembly and corrosion resistant attachment capable of withstanding winds in accordance with requirements contained in Pennsylvania Department of Transportation Specifications Publication 647.

C. Provide moisture-proof cable entry points.

D. Provide heavy-duty pan and tilt drive and camera as parts of the camera assembly. Install and setup all elements of camera assembly prior to field installation.

E. Configure camera with PTZ functions to return automatically to related "Home" viewing position. Configure the subtitle or sector for each camera view position and preset. Display subtitles with the associated video image. Include the road the camera is on, camera number, and any other information directed by the Engineer.

T.247.3.2 CABLES AND SURGE PROTECTION:

A. Install cables between the ITS cabinet and CCTV camera assembly as indicated and as recommended by the CCTV camera manufacturer.

B. Install all cables inside conduit or hollow pole with no exposed portions, unless otherwise approved by the Engineer.

C. For installation of coaxial cables through a hollow structure, make provisions to keep some slack in the vertical cable run within the structure.

D. Provide strain-relief mechanism to the cable in vertical runs exceeding 50 feet.

E. Properly install all connectors as recommended by the Manufacturer and approved by the Engineer.

F. Submit connectors and method of connectorization to the Engineer for review and approval.

G. Test the system in accordance with Section T.250.

H. Train the DRPA personnel in accordance with Section T.260.

T.247.3.3 CCTV CAMERA SURGE PROTECTION SYSTEM:

A. Provide surge protection devices meeting the following minimum requirements as well as surge protection requirements T.247.

B. Provide re-settable surge protection devices incidental to the cable installation, for all copper cables between the ITS cabinet and CCTV camera assembly.

T.247.3.4 IP CAMERA SURGE PROTECTION:

A. Multi-function: protect network (Cat-6) and low-voltage power for IP CCTV Camera assembly meeting the following minimum requirements:

a. Performance Rating: Cat-6, all pins and 4-pairs protected

b. Data Rate: 100Mbps (100Base-T) with shielded RJ-45 connectors

c. Standard Compliance: TIA/EIA-568A and B

d. Connectors: RJ-45 in/out, 8 pins; Screw terminals (power)

e. Insertion Loss: < 0.2 dB, typical

f. Peak Surge Current: 268A/pair (10/1000uSec) Network/Data; 2000A/pair (8/20uSec) typical

g. Response Time: < 1pSec, typical

h. Single point ground

i. Frequency: DC to 10MHz, typical

j. Max Continuous Current: 0.3A Video/Data; 5A/pair Power

k. Environmental: -40 to +158 degrees F temperature, typical; up to 95% non-condensing, humidity

l. UL-listed, meeting UL 96A, UL 497A/B/C, NEC 2011, applicable ANSI/IEEE standards

m. Include surge protection device cut-sheets and details in the shop drawings for review and approval by Engineer prior to procurement and installation of devices

T.247.3.5 CAMERA FIELD ENCLOSURE:

A. Provide each CCTV camera site with a field enclosure as specified and in accordance with T.248.

T.247.3.6 MANUFACTURER WARRANTY

A. The Manufacturer shall warrant to the DRPA that all materials and equipment furnished under this Contract shall be new unless otherwise specified and

approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.

B. All work not conforming to these standards may be considered defective.

C. The Manufacturer shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.

D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.

E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

F. If, during final inspection by the DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the DRPA, a second inspection shall be made following correction, and the one (1) year guarantee shall run from the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in writing.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

H. The DRPA reserves the right to immediately affect both temporary and permanent repairs, or arrange for others to affect such repairs, if the DRPA determines that an emergency situation is presented by the Contractor's defective work or materials. Such temporary and permanent repairs shall be at the expense

of the Contractor, and the Contractor agrees that in such event the DRPA shall be reimbursed by the Contractor or by its surety.

END OF SECTION T.247

SECTION T.248 ITS DEVICE FIELD ENCLOSURE, STRUCTURE MOUNT

T.248.1 GENERAL

T.248.1.1 DESCRIPTION

This work shall consist of furnishing and installing a structure mounted cabinet to house the communications and power hardware and associated cabling and wiring required for a CCTV camera, as indicated on the drawings, as specified herein and as directed by the Engineer.

T.248.1.2 QUALITY ASSURANCE

Conform to the Contract Drawings.

T.248.1.2 SUBMITTALS

At least ten (10) days prior to installation of the cabinet, submit to the DRPA for approval, the Manufacturer's printed product information and shop drawings indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

T.248.2 MATERIALS

A. Provide a cabinet meeting or exceeding the requirements of a NEMA 3R rating.

B. Provide cabinet and doors fabricated from marine grade 5052-H32 sheet aluminum at least 0.125 of an inch thick and adequately reinforced.

C. Provide continuous seams, solid welds made by the Heliarc welding method. Provide neatly formed welds, free from cracks, blowholes, and other irregularities.

D. Provide cabinet roof that is slanted away from the cabinet to prevent water from collecting on the top of the cabinet. Provide a drip shield which is incorporated into construction of the roof to protect the front and rear doors from run-off water.

E. Provide a cabinet with minimum dimensions of height, width, and depth of 30-inch, 30-inch, and 12-inch respectively, such that selected components and cables can be fitted. The use of a smaller cabinet must be submitted and approved by the Engineer.

F. Meet minimum clearances of all components as specified by the manufacturer and approved by the Engineer. Do not exceed any minimum-bending radius for cables as specified by the manufacturer.

G. Provide a vented cabinet with a forced air fan system. The force air fan system must be thermostatically controlled with air exhausted through the cabinet ventilation system.

H. Provide doors hinged along the right side. Provide hinges and pins made of stainless steel conforming to ASTM A276. Provide one continuous hinge mechanism along the entire side. Provide doors equipped with an adjustable doorstop to hold the door open at the angles of 90 degrees, 135 degrees, and 180 degrees with respect to the front of the cabinet.

I. Provide gaskets permanently bonded to the metal on all door openings. Cover the mating surface of the gaskets with a silicone lubricant to prevent sticking to the mating surface.

J. Equip the inside door with a metallic document pocket capable of holding 11" x 14" documents.

K. Provide a cabinet equipped with swing-out standard 19-inch equipment racks or access to both front and rear of the cabinet. Install a pullout shelf capable of holding a minimum of 20 lb.

L. For all structure mounted cabinets, provide cabling to the ITS cabinet from the rear.

M. Power Distribution Panel

1. Provide all cabinet accessories powered from a power distribution panel to be furnished and installed as an integral part of the cabinet. Feed the power distribution panel using conductors sized on Contract Drawings protected by circuit breakers. Power distribution panel, must meet the following requirements:

    a. 120/240 VAC

    b. Single Phase

    c. Three Wire

    d. 100 Amp Main Lugs (Minimum)

    e. 8 Single Pole Circuit Breaker Capacity (Minimum)

    f. NEMA 1 Enclosure

    g. Isolated Neutral Bus

h. Ground Bus

2. Provide power distribution panel containing the following circuit breakers: 1-two pole, 240VAC rated main breaker and single pole, 120 VAC rated, circuit breakers with the current capacity:

a. 20 amp main circuit breaker

b. 15 amp circuit breaker for duplex equipment outlet

c. 15 amp circuit breaker for duplex convenience outlet

3. Provide capacity to operate all the equipment noted in the beginning of this section, plans plus spare breaker space.

N. Neutral bus

1. Provide a neutral bus comprised of a solid metallic strip rigidly mounted on the power panel which is isolated from cabinet ground.

2. Provide all neutral conductors terminated on the neutral bus.

O. Ground Bus

1. Bond the cabinet, the power distribution panel, the service ground wire and the branch circuit ground wires to the ground bus.

2. Furnish and install a ¾" by 10' copper clad steel ground rod at the cabinet location.

3. Bond the ground bus to the ground rod with AWG #4 ground wire.

P. Duplex Outlet

1. Furnish and install duplex receptacles with box and cover plate.

Q. Convenience Outlet

1. Furnish and install one duplex, NEMA 5-15R, GFCI receptacle with box and cover plate able to be accessed after all equipment is installed within the cabinet.

2. Furnish a UL listed receptacle meeting Federal Spec. # WC596.

R. Surge Protection

1. Provide a surge protection panel that consists of dual element protection for electrical service mains, data and coax cables.

2. Surge protection equipment must have independent primary and secondary stages, which use silicon avalanche diode (SAD) on the primary stage and metal oxide varistor (MOV) on the secondary stage.

3. Surge protection equipment must be UL listed.

4. Provide elements that are easily replaceable with ordinary tools.

S. #14 AWG wire

1. All internal branch circuits must be wired using #14 AWG wire.

T.248.3 METHOD OF CONSTRUCTION

A. Prior to installation, mark the proposed location in the field. Review and obtain approval of the cabinet location from the Engineer and adjust if necessary.

B. Use a bushing on the end of the conduit inside the cabinet to prevent chafing of the cables.

C. Install the device control equipment and connect power. Connect to the equipment safety ground. Connect communications cable.

END OF SECTION T.248

SECTION T.249 ITS DEVICE FIELD ENCLOSURE, GROUND MOUNT

T.249.1 GENERAL

T.249.1.1 DESCRIPTION

This work shall consist of furnishing and installing a ground mounted cabinet to house the communications and power hardware and associated cabling and wiring required for a variable message sign, variable speed limit sign, lane use control sign ,and CCTV hub, as indicated on the drawings, as specified herein and as directed by the Engineer.

T.249.1.2 QUALITY ASSURANCE

Conform to the Contract Drawings.

T.249.1.2 SUBMITTALS

At least ten (10) days prior to installation of the cabinet, submit to the DRPA for approval, the Manufacturer's printed product information and shop drawings indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

T.249.2 MATERIALS

A. Provide a cabinet meeting or exceeding the requirements of a NEMA 3R rating.

B. Provide cabinet and doors fabricated from marine grade 5052-H32 sheet aluminum at least 0.125 of an inch thick and adequately reinforced.

C. Provide continuous seams, solid welds made by the Heliarc welding method. Provide neatly formed welds, free from cracks, blowholes, and other irregularities.

D. Provide cabinet roof that is slanted away from the cabinet to prevent water from collecting on the top of the cabinet. Provide a drip shield which is incorporated into construction of the roof to protect the front and rear doors from run-off water.

E. Provide a cabinet with minimum dimensions of height, width, and depth of 66-inch, 24-inch, and 30-inch respectively, such that selected components and cables can be fitted. The use of a smaller cabinet must be submitted and approved by the Engineer.

F. Meet minimum clearances of all components as specified by the manufacturer and approved by the Engineer. Do not exceed any minimum-bending radius for cables as specified by the manufacturer.

G. Provide a vented cabinet with a forced air fan system. The force air fan system must be thermostatically controlled with air exhausted through the cabinet ventilation system.

H. Provide doors hinged along the right side. Provide hinges and pins made of stainless steel conforming to ASTM A276. Provide one continuous hinge mechanism along the entire side. Provide doors equipped with an adjustable doorstop to hold the door open at the angles of 90 degrees, 135 degrees, and 180 degrees with respect to the front of the cabinet.

I. Provide gaskets permanently bonded to the metal on all door openings. Cover the mating surface of the gaskets with a silicone lubricant to prevent sticking to the mating surface.

J. Equip the inside door with a metallic document pocket capable of holding 11" x 14" documents.

K. Provide a cabinet equipped with swing-out standard 19-inch equipment racks or access to both front and rear of the cabinet. Install a pullout shelf capable of holding a minimum of 20 lb.

L. Provide a concrete pad to ground-mount the cabinet per the details shown in the contract drawings.

M. Power Distribution Panel

1. Provide all cabinet accessories powered from a power distribution panel to be furnished and installed as an integral part of the cabinet. Feed the power distribution panel using conductors sized on Contract Drawings protected by circuit breakers. Power distribution panel, must meet the following requirements:

   a. 120/240 VAC

   b. Single Phase

   c. Three Wire

   d. 100 Amp Main Lugs (Minimum)

   e. 8 Single Pole Circuit Breaker Capacity (Minimum)

   f. NEMA 1 Enclosure

   g. Isolated Neutral Bus

h. Ground Bus

2. Provide power distribution panel containing the following circuit breakers: 1-two pole, 240VAC rated main breaker and single pole, 120 VAC rated, circuit breakers with the current capacity:

For VMS, VSL, and LUCS

a. 60 amp main circuit breaker

b. 15 amp circuit breaker for heater, lamp and cooling fan

c. 15 amp circuit breaker for duplex convenience outlet

For CCTV Hub

a. 20 amp main circuit breaker

b. 15 amp circuit breaker for heater, lamp and cooling fan

c. 15 amp circuit breaker for duplex equipment outlet

d. 15 amp circuit breaker for duplex convenience outlet

3. Provide capacity to operate all the equipment noted in the beginning of this section, plans plus spare breaker space.

N. Neutral bus

1. Provide a neutral bus comprised of a solid metallic strip rigidly mounted on the power panel which is isolated from cabinet ground.

2. Provide all neutral conductors terminated on the neutral bus.

O. Ground Bus

1. Bond the cabinet, the power distribution panel, the service ground wire and the branch circuit ground wires to the ground bus.

2. Furnish and install a ¾" by 10' copper clad steel ground rod at the cabinet location.

3. Bond the ground bus to the ground rod with AWG #4 ground wire.

P. Duplex Outlet

1. Furnish and install duplex receptacles with box and cover plate.

Q. Convenience Outlet

1. Furnish and install one duplex, NEMA 5-15R, GFCI receptacle with box and cover plate able to be accessed after all equipment is installed within the cabinet.

2. Furnish a UL listed receptacle meeting Federal Spec. # WC596.

R. Surge Protection

1. Provide a surge protection panel that consists of dual element protection for electrical service mains, data and coax cables.

2. Surge protection equipment must have independent primary and secondary stages, which use silicon avalanche diode (SAD) on the primary stage and metal oxide varistor (MOV) on the secondary stage.

3. Surge protection equipment must be UL listed.

4. Provide elements that are easily replaceable with ordinary tools.

S. #12 AWG wire

1. All internal branch circuits must be wired using #12 AWG wire.

T.249.3 METHOD OF CONSTRUCTION

A. Prior to any excavation for the concrete cabinet foundation, mark the proposed location in the field. Review and obtain approval of the cabinet location from the Engineer and adjust if necessary.

B. Before forming and placing concrete for the cabinet foundation, each location will be inspected for the actual soil conditions encountered. Do not proceed with the work until the excavation is accepted by the Engineer. If necessary, revise the foundation design based on the soil conditions encountered and submit the revised design for approval prior to construction.

C. Adequately brace and support the concrete forms so that deflection does not exceed ½-inch under plastic concrete. Before using forms, clean them of all debris. Coat forms with a non-staining release agent.

D. Install anchor bolts, conduit sweeps, and ground rods with ground wire clamps.

E. Chamfer the edges of the concrete foundation as indicated on the contract drawings.

F. Do not damage the concrete on the exposed surface when removing forms.

G. Restore areas damaged by construction. Backfill around the foundation in 6-inch layers with selected on-site material, then compact to the density of the adjacent undisturbed earth. Dispose of excess or unsuitable material.

H. After placing concrete, do not install cabinet for minimum of 72 hours.

I. Use a bushing on the end of the conduit inside the cabinet to prevent chafing of the cables.

J. Install the device control equipment and connect power. Connect to the equipment safety ground. Connect communications cable.

END OF SECTION T.249

SECTION T.250 ITS SYSTEMS TESTING

T.250.1 DESCRIPTION

This work shall consist of testing the Variable Message Sign (VMS) System, the Variable Speed Limit (VSL) Sign System, the Lane Use Control Signal (LUCS) System, and the CCTV Camera System as required to ensure that the system elements fulfill the contract requirements and are properly integrated into the existing system, to achieve fully functioning and operating systems.

T.250.2 GENERAL TESTING REQUIREMENTS

A. The Variable Message Sign Manufacturer's Representative and/or Software Integrator shall be responsible to conduct all tests for the Variable Message Sign System.

B. The Variable Speed Limit Sign Manufacturer's Representative and/or Software Integrator shall be responsible to conduct all tests for the Variable Speed Limit Sign System.

C. The Lane Use Control Signal Manufacturer’s Representative and/or Software Integrator shall be responsible to conduct all tests for the Lane Use Control Signal System.

D. The CCTV Camera Manufacturer’s Representative and/or Integrator shall be responsible to conduct all tests for the CCTV Camera System.

E. The DRPA at its discretion may waive any and all of these tests.

F. Conduct the following tests, in the order indicated, on each piece of equipment, subsystem and system, as required, that will be furnished and installed under this contract:

1. Factory Demonstration Tests - Conduct factory demonstration tests at the manufacturer's facility prior to shipping the equipment, to verify that each system meets the contractual requirements.

2. On-Site Stand Alone Tests - Conduct on-site stand -alone tests at each field location to verify that each individual field sub-system satisfies the functional requirements of this contract. Conduct these tests prior to interconnection to the Police Radio Room (PRR).

3. Final System Acceptance Tests - Conduct final system acceptance tests from the PRR and field locations, as required, to verify that the overall system meets the requirements of this contract. Conduct testing in the order indicated. Do not begin a later stage of testing until earlier stage(s) of testing have been successfully completed and approved by the DRPA.

G. Testing is staged as outlined above to isolate and limit any unforeseen problems. The acceptance of each stage of testing does not imply that problems found at a later date or stage of testing will not require the Manufacturer's Representative to return to an earlier stage of testing for a component or sub-system. Retest to the level necessary to isolate any problem(s) and establish a course of action to remedy the situation.

H. In the event that 10% or more of similar equipment malfunctions during the test period, the DRPA may declare a system defect and require replacement of all similar equipment at no additional cost. When a system defect is declared, retest that specific system. Document its successful completion.

I. If a unit has been modified as a result of the equipment replacement, prepare a report and deliver it to the DRPA for approval. Describe in detail in the report the nature of the failure and the corrective action(s) taken. If a failure pattern, as defined by the DRPA, develops, the DRPA may direct that design and construction modifications be made to all similar units without additional cost to the DRPA. If common problems are apparent on multiple units, modify all units without additional cost to the DRPA.

J. Provide test documentation, including at a minimum: test procedures, checklist, and test forms and data summary sheets for each item. Tailor test documentation for each item being tested.

K. Submit testing documentation for DRPA's approval. After test documentation is approved, provide advance notice prior to conducting the test, as specified for each test, to permit the DRPA to observe each test.

L. Submit all test results to the DRPA for approval. The results of each test will be compared with the requirements specified herein. Failure to conform to the requirements of any test will be considered a failed test and such equipment defective and subject to rejection by the DRPA. In the event a defect is determined, analyze and categorize all defects as to whether they are limited to the specific unit being tested or could be a potential problem in all such units.

M. Equipment rejected because of problems limited to the specific unit being tested may be offered again for retest provided all non-compliance issues have been corrected and retested by the Manufacturer's Representative and evidence thereof submitted to the DRPA.

N. Test the equipment in accordance with approved test procedures only. Record test results on data summary sheets for each piece of equipment tested.

O. Provide certification of test results by a qualified representative. Submit all test records to the DRPA immediately following the test for approval.

P. Complete testing for each equipment unit, in a reasonable time frame as determined by the DRPA. Schedule testing with ample additional time allotted for the DRPA to request that certain portions of the test be repeated.

Q. The DRPA has the right to witness and/or assign his/her representative to witness any test.

R. The approval of test procedures and witness of such tests does not relieve the Manufacturer's Representative of his/her responsibility to provide a completely acceptable and operating system that meets the requirements of these Contract Documents.

T.250.3 FACTORY DEMONSTRATION TESTS

A. It is expected that most of the equipment specified for this project can be provided with standard off-the-shelf equipment having certification of compliance with industry accepted standards that also meet the requirements of this contract. Prepare factory acceptance test documentation as required. Conduct Factory Acceptance Tests at the manufacturer's facility for every piece of equipment provided for this project.

B. For cases where equipment has been operated successfully by other Transportation Agencies for similar applications, design approval tests may be partially or entirely waived by the DRPA provided that proper documentation of such successful usage is supplied by the Manufacturer's Representative to the DRPA. Submit certification by an independent testing laboratory or from the Manufacturer that these design approval tests or comparable tests have been previously completed with satisfactory results by other Transportation Agencies.

C. Where a standard of-the-shelf product is supplied for this project, and design approval tests have been waived by the DRPA for the product, conduct a factory acceptance test on an in-stock unit prior to commencing production of all equipment for this project. Provide those test results to the DRPA.

T.250.4 ON-SITE STAND-ALONE TESTS

A. Following the installation of equipment at all field locations for the VMS,VSLS, LUCS, and CCTV conduct field tests on each piece of equipment, at each installation site exercising all stand-alone functionality to verify that components, modules, or sub-systems of equipment operate properly in their intended application to the extent possible prior to connection to other sub-systems. Provide the required equipment including a portable computer, and test software to perform local system operations arid diagnostic test procedures.

B. Submit test procedures, checklists, and summary sheets for DRPA's approval prior to performing tests. Do not begin testing until test procedures have been approved.

C. Provide at least ten (10) working days notice prior to all tests to permit the DRPA to observe each test.

D. If a system fails to meet the requirements specified, rectify the system as required and repeat the tests until successful, at no additional cost to the DRPA. If a system

component has been modified as a result of the test failure, prepare a detailed report on the modifications to the system or software and submit it to the DRPA. Describe in the report the nature of the Failure and the corrective action(s) taken.

T.250.5 FINAL SYSTEM ACCEPTANCE TESTS

A. Following installation of all the equipment at all the field locations and the PRR, and the successful completion of all on-site stand-alone tests, conduct tests to verify final system acceptance of all systems.

B. Provide at least ten (10) working days notice prior to all tests to permit the DRPA to observe each test. Conduct system acceptance tests on all system components, sub-systems, and systems that are being furnished under this contract. Conduct tests from the PRR (with witnesses in the field), exercising functional and interface requirements as required by these Contract Documents.

C. Conduct final system acceptance tests in two (2) stages as follows:

1. System Interface Test

   a. Conduct the system interface test after all equipment is installed and interconnected, and ready to operate as a system. System interface tests are intended to strategically isolate interconnected sub-systems and demonstrate in a piece-wise manner that the transfer of information occurs properly and is capable of achieving functional objectives described in these Contract Documents. System interface tests for the PRR computer system will demonstrate that bits which are properly set in the computer's output buffers pass through the proper interface to the intended location to achieve the desired function.

   b. Develop or provide the necessary test software to perform the system interface test described above for all the systems.

2. System Performance Test

   a. Conduct the system performance test from the PRR and if required, from the field locations, after the system interface tests have been successfully performed and accepted for all the systems.

   b. Fully test all functions of the new ITS/ traffic control equipment through the existing traffic control equipment software.

   c. Utilize the particular device’s control software to fully test all functions for each system.

   d. Fully exercise all functions of the VMS/VSLS/LUCS/CCTV and control equipment system for each field location. Demonstrate that the

communications system is fully functional, including network management, malfunction isolation/diagnosis of failed equipment, and performance monitoring, if applicable.

e. In the event of a test failure, perform a partial or total re-test to demonstrate that the system is functioning as a whole.

T.250.6 30-DAY OBSERVATION PERIOD

A. A 30-day observation period will follow the System Acceptance Test, during which system failures will be categorized as Catastrophic (rendering all of a particular device totally unusable), Major (rendering most (60%) of a particular device unusable), Minor (rendering a few (less than 10%) of a particular device unusable). If a Catastrophic Failure occurs, the 30-Day count will stop. If multiple Catastrophic Failures occur, DRPA reserves the right to restart the 30-Day observational period to day 1. If a Major Failure occurs, the 30-Day count will stop. If multiple (2 or more) Major Failures occur, DRPA reserves the right to restart the 30-Day observational period to day 1. If a Minor Failure occurs, the 30-Day count will stop only if the solution takes greater than 1 day to resolve, otherwise the day count will not stop. If multiple (greater than 3) Minor Failures occur in any one subsystem on a given day, the supplier will add one additional day to the 30-Day observational period for each occurrence.

END OF SECTION T.250

SECTION T.251-253 FIBER OPTIC TERMINATION PATCH PANELS, 6 PORT, 12 PORT, & 24 PORT

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 251	FIBER OPTIC TERMINATION PATCH PANEL, 6 PORT
ITEM 252	FIBER OPTIC TERMINATION PATCH PANEL, 12 PORT
ITEM 253	FIBER OPTIC TERMINATION PATCH PANEL, 24 PORT

T.251.1 GENERAL

T.251.1.1 DESCRIPTION

This work shall consist of furnishing and installing a fiber optic termination panel for the splicing and termination of outside plant fiber optic cable to factory manufactured connectors in a cabinet that provides front access to terminated fibers. This work includes splicing to 12-fiber cable bundles, mounting the panel to a 19-inch rack, attaching LC fiber optic patch cables, and testing.

T.251.1.2 QUALITY ASSURANCE

Conform to the Contract Drawings.

T.251.1.2 SUBMITTALS

At least ten (10) days before beginning the installation, submit the Manufacturer's printed product information/cut-sheet to the DRPA for approval, indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

T.251.2 MATERIALS

A. The panel must meet or exceed the following specifications:
   1. Connector type: LC
   2. Painted metal construction; with a panel door to provide interior accessibility.
   3. The panel must include space and a mechanism for storing fiber splices and slack for both used and unused fibers within the panel.
   4. Terminations are made by fusion splicing pre-terminated single mode fiber pigtails to the fiber cable. Mechanical, chemical or epoxy-type connectors and splices will be considered unacceptable.
   5. Each connector on the panel must be optically connected to a fiber in the 12-strand fiber drop cable, and have an insertion loss of 0.3 dB (typical) and 0.5 dB (maximum) when tested at 1310 or 1550 nm.
   6. Panels are to be rack-mountable to EIA 19-inch equipment racks.
   7. WWB Admin Building

a. (2) 12 port in the Computer Room
b. 24 port in the Equipment Room
c. Standard 19” rack mountable

8. WWB Field Locations
   a. 6 port at each CCTV Hub cabinet and CCTV cabinet
   b. 12 port at each CCTV Hub cabinet
   c. 24 port at each VMS cabinet and AM cabinet
   d. Standard 19” rack mountable as applicable

T.251.3 METHOD OF CONSTRUCTION

A. Provide and install FTPs, as indicated, for the splicing and termination of fiber optic cable to factory manufactured connectors in a cabinet that provide access to terminated fibers as indicated. This work also includes terminating fiber optic cables at the WWB administration building and each field location cabinet as shown in the plans. Fiber optic termination panels shall be Corning or an approved equal.

B. All fibers entering the cabinet are to be terminated on the rear of the connector panel, with LC connectors. Jumpers of sufficient length are to be provided and installed to connect the front side of the connector panel to the fiber equipment contained within the cabinet as specified herein.

C. LC connectors are to terminate in single mode fiber pigtails fusion spliced to the 12-fiber drop cable as described herein and shown in the plans.

D. All conduits, cables, and equipment cabinets/enclosures shall be clearly and adequately identified at both ends of the cables and conduits to reflect cable/conduit ID, system/use.

END OF SECTIONS T.251 – T.253

SECTION T.254 FIBER OPTIC PATCH CABLES

T.254.1 GENERAL

T.254.1.1 DESCRIPTION

This work shall consist of furnishing and installing single mode LC-LC patch cables.

T.254.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. TIA/EIA-568-A standards;

C. ISO/IEC 11801 standards.

T.254.1.2 SUBMITTALS

At least ten (10) days before beginning the installation, submit the Manufacturer's printed product information/cut-sheet to the DRPA for approval, indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

T.254.2 MATERIALS

A. LC-style connectors (snap-type) with 1.25 mm diameter ceramic ferrules with non-optical disconnect functionality. Shall be TIA/EIA-604 FOCIS-10 compatible

B. The patch cables are to meet the following specifications:

1. Insertion Loss: 0.1 dB average per mated pair (typical at 1310 nm)

2. Return Loss > 40 dB

3. Durability < 0.1 dB over 200+ insertions

4. Operating Temperature -40 C to +75 C (-40 F to 158 F)

5. Length 10 feet

C. Each patch cable is to be made of 9.3/125 single mode optical fiber, tight-buffered, surrounded with a combination of high tensile strength dielectric yarns, and housed within an impermeable outer plastic jacket. The cable is to have a

flammability rating of Low Smoke Zero Halogen (LSZH) and is to meet or exceed FAR 25.

D. Each patch cable is to conform to the TIA/EIA-568-A and ISO/IEC 11801 standards.

T.254.3 METHOD OF CONSTRUCTION

A. LC connectors are to be plugged into the appropriate fiber termination and equipment connectors as shown on the plans.

END OF SECTION T.254

SECTION T.255 COMMUNICATION SYSTEM

T.255.1 GENERAL

T.255.1.1 DESCRIPTION OF WORK

This work is furnishing, installing, and wiring the complete Traffic Control Communication System, including the distributed control units (DCU) at the device locations and the connection to existing control system at the Walt Whitman Bridge Administration Building as indicated on the drawings, as specified herein and as directed by the Engineer. The DCUs will be connected together via Single Mode Fiber Optic cable.

T.255.1.2 QUALITY ASSURANCE

A. Conform to the following:

1. Contract Drawings;

2. The latest approved versions of the National Transportation Communication for ITS Protocol (NTCIP) Standards;

B. All work shall be performed in accordance with the latest edition of the National Electric Code (NEC). The Contractor shall be fully responsible for selection of proper type and method of wiring and conduit as necessary to suit system, equipment and code requirements.

T.255.1.3 SUBMITTALS

A. At least ten (10) days before beginning the installation, submit to the DRPA for approval, the Manufacturer's printed product information indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

B. At least ten (10) days before beginning the installation, Submit shop drawings showing cabinet dimensions, wiring schematics and details of the grounding system to the Engineer for approval prior to beginning work.

C. Submit all Shop Drawings, Catalog Cuts, and submittals prepared by the Manufacturer for review and approval by the Engineer

D. Prepare shop drawings in accordance with the requirements of the Special Provisions

E. Provide diagram of system power interconnection wiring, broken down into "factory" and "field" wiring

F. Provide detailed drawings for all equipment and outdoor environmental housings proposed for the System, including physical layout of internal components and proposed mounting or installation locations. Include catalog cuts of any “off-the-shelf” enclosures used

G. Provide catalog cuts for all enclosures, interior switches, circuit breakers, receptacles, heating, cooling, and ventilation equipment, surge protection devices, wiring type and size, light sensing configuration, control equipment, and all other components and materials that provide a complete installation

T.255.2 MATERIALS

T.255.2.1 DISTRIBUTED CONTROL UNIT

A. All points in the system shall be monitored and/or controlled through "intelligent" Distributed Control Units (DCUs) located in the equipment room at the Administration building and connected via a LAN carried on two fibers of the new fiber optic cable installed in accordance with section T.240-T.242.

B. Each DCU in the system shall contain its own microprocessor and memories and be a completely independent stand-alone "master". Systems using a master/slave arrangement shall be unacceptable under this specification.

C. The DCUs shall be compatible with the Energy Net System currently installed at the Walt Whitman Bridge. The modified system shall be compatible with the MONITOR operating system software and shall possess identical communications ability and functionality of the controllers currently installed at the Walt Whitman Bridge. Mixing of different manufacturer’s electronic equipment shall not be permitted.

D. The existing system consists of Andover Controls master and local controllers, and digital and analog input/output units. The system was designed and installed by TRI-M Building Automation Systems, Inc., 204 Gale Lane, Kennett Square, PA. 19348.

E. Distributed Control Units shall consist of the following modules:

1. Local Control Units - Andover Continuum Infinet II i2810 Series. Provide sufficient Local Control Units in each DCU to accommodate the inputs and/or outputs required for that location

2. Communications Unit – Antaira STF-500C Series Media Converter with single or dual fiber optic to RS-232/422/485 conversion capability.

3. 24v ac relay controls

4. 120v relay controlled power contactors

5. Power Supply - 120v ac

6. Manual override switch panel in a NEMA 3R enclosure.

F. Provide controller, communications unit, and all required accessories to make up a fully operational unit. These accessories shall include circuit breakers, power contactors, relays, electric to optic convertor, transformers, surge suppressor, lightning arrestor, cabinet temperature sensor, current sensors, terminal strips, panduit, etc.

G. If the CPU transmission network fails, the DCU shall continue to perform all control functions associated with the points connected to the network using last data received.

H. The DCU shall be capable of recording, evaluating and reporting changes of state that occur among the points associated with it.

I. The DCU shall have the following Input / Output capability:
1. Discrete digital input (dry contact) for status of equipment;
2. Discrete digital output (maintained and momentary) for control of equipment;
3. Analog input (4-0 ma and 0-5 VDC with 8-bit D/A resolution) for current and voltage sensing and panel temperature.

J. DCU Upload/Download Capability: Each DCU shall be capable of being downloaded from or uploaded to the main CPU. All point and control data shall be modifiable from the main CPU and downloaded to the DCU. It shall not be necessary to enter parameters locally at the DCU for control and programs to take effect.

K. DCU Test Mode Operation: Each DCU shall have the ability to place input/output points in a test mode. The test mode shall allow control algorithms to be tested and developed without disrupting the field hardware.

T.255.2.2 SUPPRESSION NETWORK

A. All wired communications channels to and from the Central Processor Unit (CPU) shall have transient suppression network installed at the field panels. The transient protection shall meet IEEE Standard C37.90a-1974. The suppression network shall be automatic, self-restoring and on duty at all times.

T.255.2.3 #14 CONDUCTORS:

A. Provide No. 14 AWG copper Type THHN-THWN solid conductor complying with NEMA WC.

T.255.3 METHOD OF CONSTRUCTION

A. Mount the DCU on the controller cabinet backplate with all the required accessories. Bring all panel wiring to a clearly labeled terminal strip to land field wiring for power supply and control circuits and fiber optic cables.

B. Furnish, install, and test all # 14 AWG communication cables, components and subsystems from the DCU to each ITS device as specified.

C. Fully and completely test all communication cables, components and subsystems at a minimum, but not limited to the following:

1. Continuity
2. Open and Shorts
3. Terminal connection testing
4. Reversed/crossed pairs

D. Using appropriate test equipment that ensures proper operations and performance for all connections.

END OF SECTION T.255

SECTION T.256 ETHERNET SWITCH

T.256.1 GENERAL

T.256.1.1 DESCRIPTION

This work shall consist of furnishing and installing Cisco IE 4000 Ethernet switches as indicated on the drawings, as specified herein and as directed by the Engineer.

T.256.1.2 QUALITY ASSURANCE

Conform to the Contract Drawings.

T.256.1.2 SUBMITTALS

At least ten (10) days before beginning the installation, submit to the DRPA for approval the Manufacturer's printed product information/cut-sheet indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

T.256.2 MATERIALS

A. Provide a Cisco manufactured IE 4000 Ethernet switch with 20-Gbps non-blocking switching capacity with up to 20 Gigabit Ethernet ports per switch and a robust resiliency enabled by dual ring design via 4x Gigabit Ethernet uplink ports.

B. Provide a minimum (12) 10/100/1000 ports and two (2) 1000 BASE-LX (single mode fiber) uplinks.

C. Provide minimum (8) PoE capable ports supplying 30W (PoE+) respectively.

D. Provide accompanying Cisco ONE software and the associated licensing.

E. Provide power supply and rack adapter supplied by Cisco for the model IE 4000 switch.

T.256.3 METHOD OF CONSTRUCTION

A. Install one (1) Ethernet switch in the equipment rack and connect the associated patch cables at each location per the contract drawings.

END OF SECTION T.256

SECTION T.257 ETHERNET MEDIA CONVERTER

T.257.1 GENERAL

T.257.1.1 DESCRIPTION

This work shall consist of furnishing and installing Ethernet Media Converters as indicated on the drawings, as specified herein and as directed by the Engineer.

T.257.1.2 QUALITY ASSURANCE

Conform to the Contract Drawings.

T.257.1.3 SUBMITTALS

At least ten (10) days before beginning the installation, submit to the DRPA for approval the Manufacturer's printed product information/cut-sheet indicating material characteristics, performance criteria, product limitations, preparation requirements and installation procedures.

T.257.2 MATERIALS

A. Provide a Versitron Inc. Ethernet Media Converter meeting or exceeding the following specification:

1. IEEE 802.3 compliant
2. Provide 10/100 Base-T/TX electrical port and 100 Base-FX optical port
3. Electrical port support for Auto-Negotiation for 10Mbps or 100Mbps, full duplex or half duplex data
4. Optical port support 100Mbps full duplex data
5. Support distances up to 12 miles (single mode fiber) – Determine appropriate optics for distance between IP cameras and their respective HUB.
6. Meet NEMA TS-1/TS-2 environmental and mechanical specifications for outdoor environment
7. Provide RJ-45 electrical port connectors and LC optical connectors – Determine final connector type and submit to the Engineer for review and approval
8. Provide either rack or panel mounted depending on location. Submit to Engineer for review and approval
9. Support 12VDC power
10. Environmental Requirements: -29 degrees F to +165 degrees F; up to 95% (non-condensing) humidity
11. MTBF: minimum 100,000 hours

B. Provide power supply and rack adapter supplied by Ethernet Media Converter vendor for the model provided at each CCTV Hub location.

T.257.3 METHOD OF CONSTRUCTION

A. Install Ethernet Media Converter(s) in the equipment rack or on the wall panel and connect the associated patch cables at each location as indicated on the contract drawings and as directed by the Engineer.

END OF SECTION T.257

SECTION T.258 ITS DEVICE SPARE PARTS

T.258.1 GENERAL

T.258.1.1 DESCRIPTION OF WORK

This work is providing, furnishing, and delivering ITS Device Spare Parts to the DRPA as indicated herein and as directed by the Engineer.

T.258.2 MATERIALS

A. Order the Manufacturer recommended VMS, LUCS, and VSLS spare parts at the same time as when the field device units (VMS, LUCS, and VSLS) are ordered to receive the Manufacturer's discount.

B. VMS Spare Parts:
1. Twelve (12) : 20mm RGB 30 Degree Module (Gen III displays)
2. Two (2) : Power Supply
3. One (1) : VFC CONTROLLER
4. One (1) : Can Temp/Hum & Light Detector
5. One (1) : VCB
6. One (1) : Surge Suppressor

C. LUCS Spare Parts:
1. Two (2) : Module
2. One (1) : Power Supply
3. One (1) : VFC CONTROLLER

D. VSLS Spare Parts:
1. One (1) : Module
2. One (1) : Power Supply
3. One (1) : M3 CONTROLLER

E. Order the following spare parts from the associated manufacturer.
1. One (1) : CCTV Camera Assembly
2. One (1) : Ethernet Media Converter
3. One (1) : Ethernet Switch

T.258.3 METHOD OF CONSTRUCTION

A. Maintain all ITS device spare parts at a secure location during the Project.

B. Provide to the Engineer a detailed listing of the spare parts inventory, at the conclusion of the On-Site Stand Alone Tests. Include at a minimum the device name, model number, and serial number for each item.

C. Provide all spare parts to the Engineer prior to the conclusion of the Final System Acceptance Tests.

D. Coordinate delivery with the Engineer and the DRPA.

E. Replace, at no cost to the DRPA, any equipment found to be damaged or inoperable.

END OF SECTION T.258

SECTION T.259 COORDINATION WITH TRI-M

T.259.1 GENERAL

T.259.1.1 DESCRIPTION

This work is coordinating with and utilizing Tri-M Building Automation Systems (Tri-M) to initiate and complete all integration work for integrating the new ITS devices being installed within this contract, into the existing Supervisory Control and Data Acquisition (SCADA) system, as indicated on the drawings, as specified within the Specifications, and as directed by the Engineer.

Tri-M Point of Contact:

- Mr. Bob Curry: 610-444-1002 ; BCurrie@Tri-Mgroup.com

T.259.2 METHOD OF CONSTRUCTION

Tri-M, through an existing contract with the DRPA is responsible for all integration work for the existing SCADA system.

Integration work will need to be coordinated with the physical work and the project milestone dates so as not to delay the completion of the project.

Provide the following to Tri-M:

- A detailed project work schedule
- A point of contact for all field work
- Any updates to the above

Hold bi-weekly conference calls with Tri-M, as necessary, to track all work progress, update any potential changes, and discuss potential problem areas. Provide the Engineer the opportunity to participate in the calls.

Provide updates on work progress at each Project Status meeting. If requested by the Engineer, have Tri-M attend the meetings.

Submit any changes to the project plans, due to Tri-M work, to the Engineer for review and approval prior to implementation.

END OF SECTION T.259

SECTION T.260 ITS SYSTEMS TRAINING

T.260.1 GENERAL

T.260.1.1 DESCRIPTION

This work is providing the DRPA's personnel and/or its representatives with an installation, operations, and maintenance training program for all the equipment and systems furnished under this contract. Conduct "hands-on" training at the Ben Franklin Bridge Administration Building Police Radio Room for Dispatch Personnel and conduct "hands-on" field training at the Walt Whitman Bridge field locations for Maintenance Personnel as required to adequately train all participants.

T.260.1.2 SUBMITTALS

Submit two (2) copies of the training program courseware, material, schedule, and instructor's qualifications to DRPA thirty (30) calendar days prior to conducting the training program, for approval. Should the submittal not be approved, the Manufacturer's Representative will be required to resubmit until it is approved by the DRPA. The training material will also include operation and maintenance procedures for all furnished hardware, firmware, and software. Once approved, provide to the DRPA, prior to the training date selected, two (2) paper copies as well as two (2) electronic copies on CD format, of the approved training material.

T.260.2 SERVICES

A. Provide training for up to five (5) DRPA Dispatch Personnel and five (5) DRPA Maintenance Personnel and/or their representatives, at times mutually agreed upon by the DRPA and the Manufacturer's Representative. Conduct training immediately following the successful completion of the system performance test.

B. Provide training on the Variable Message Signs and Control System for a minimum of one (l) hour for each group identified above.

C. Provide training on the Variable Speed Limit Signs and Control System for a minimum of one (l) hour for each group identified above.

D. Provide training on the Lane Use Control Signals and Control System for a minimum of one (1) hour for each group identified above.

E. Design the course to train DRPA personnel to operate the system, manage the communications network, analyze system performance, revise critical operating parameters based on the analysis, operate the Graphical User Interface, and develop graphics displays and perform routine system diagnostics and overall maintenance activities.

F. At a minimum, include the following content in the training courseware, material, and services:

1. Training on the components of each sub-system.

2. Configuration of the equipment in the Police Radio Room, Walt Whitman Bridge equipment room, and its interaction with the field equipment.

3. Fundamentals of data and telecommunications for the system.

4. Start-up and restoration after power interruption.

5. Procedures for calibration and setting adjustable components

6. Use and interpretation of diagnostic routines and any failure reports.

7. Preventative maintenance procedures and requirements.

8. Corrective maintenance procedures, troubleshooting, and malfunction isolation.

9. Generation and interpretation of system failure modes.

END OF SECTION T.260

SECTION T.261 AWG #3/0, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

T.261.1 GENERAL

T.261.1.1 DESCRIPTION

This work is the furnishing and installation of electrical conductors for roadway lighting system, which includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.261.1.2 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit certification that the following products conform to the specified requirements.

T.261.1.3 QUALITY ASSURANCE

Conform to the following:

A. PennDOT Specifications Publication 408/2016 Edition, Change No. 5, Sections 910 and 1101 - Highway Lighting

B. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Section T.18.3.4.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NFPA 70.

T.261.2 MATERIALS

T.261.2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.261.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Senator Wire & Cable Company.
4. Southwire Company.
5. Anaconda
6. National
7. Or DRPA Approved Equal.

B. Refer to Section T.18.3.1 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC ; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC.

T.261.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:

1. AFC Cable Systems, Inc.
2. AMP Incorporated/Tyco International.
3. Hubbell/Anderson.
4. O-Z/Gedney; EGS Electrical Group LLC.
5. 3M Company; Electrical Products Division.
6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.261.3 METHOD OF CONSTRUCTION

T.261.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces:

1. Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces:

1. Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade:

1. Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

T.261.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

D. Support cables according to Section T.15 "Electrical Supports and Seismic Restraints."

T.261.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than spliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for

aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.261.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing.

B. Testing: Perform the following field quality-control testing:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION T.233

SECTION T.262 NOT USED

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SECTION T.263 JUNCTION BOX, JB-11

T.263.1 GENERAL

T.263.1.1 DESCRIPTION

This work shall consist of furnishing and installing a Junction Box as indicated on the drawings, as specified herein and as directed by the Engineer.

T.263.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings & PennDOT's Standard RC-82M

B. Pennsylvania Department of Transportation Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.

T.263.1.3 SUBMITTALS

At least ten (10) days prior to beginning work, submit shop drawings to the DRPA for approval, showing the dimensions and fabrication details for the junction box.

T.263.2 MATERIALS

A. Provide a precast concrete open-bottom junction box (forty-two (42) inch x forty-two (42) inch x thirty (30) inch) per the contract drawings.

B. All materials incorporated into the work shall meet the requirements of the Pennsylvania Department of Transportation Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.2.

T.263.3 METHOD OF CONSTRUCTION

A. Obtain acceptance of any change in box location before installation.

B. Excavate and install the box. Backfill around the box and dispose of excess or unsuitable material.

C. If required: Install individual ground rods. Install additional ground rods as required if the resistance to ground is greater than 25 ohms. Attach the ground rod to the grounding electrode conductor with an exothermic weld or a bronze connector. Coat the connection with approved corrosion inhibitor. Provide an equipment grounding conductor with all circuits. Do not connect the neutral to ground except at the service location. Provide an insulated equipment grounding conductor as specified for the circuit conductors.

D. Ground exposed metal parts of junction boxes with a minimum No. 4 AWG ground wire and a minimum 1/2-inch by 8-foot ground rod. Connect the grounding electrode conductor to the ground rod with either an exothermic weld or with a bronze connector clamp. Connection to an adjacent system ground rod is allowable.

E. Follow Sections 910.3 and 1101.10 and as follows:

F. Install Junction Boxes as per manufacturer's recommendations. Construct Junction Boxes on top of 12 inches of #57 coarse aggregate; 18 inches in locations subject to flooding and poor drainage

G. Place in such a manner that after settling, the cover is 2 inch above the grass line as directed by the Engineer.

H. Place Junction Boxes 6 feet (typical) minimum from the edge of the shoulder and 20 feet (typical) minimum from the end of an overpass.

I. Place all Junction Boxes within the roadway/shoulder/walkway area in such a manner that the cover is flush with the pavement/sidewalk.

J. When necessary extend existing conduits into new Junction Box.

END OF SECTION T.263

SECTION T.264 JUNCTION BOX REMOVAL

T.264.1 GENERAL

T.264.1.1 DESCRIPTION

This work shall consist of removing and disposal of existing junction boxes as specified herein and restoring area as directed by the Engineer.

T.264.2 MATERIALS

None.

T.264.3 METHOD OF CONSTRUCTION:

T.264.3.1 General

At the appropriate time in the construction sequence, prepare the indicated junction box for removal. Disconnect the conduit and conductors. Remove the existing electrical conductors.

Remove the junction box and dispose of off-site. Fill the cavity from the removal with suitable (on-site if available) material and restore to match existing surrounding conditions.

Also, Remove the Existing conduit if not being utilized as part of this contract.

Direct buried conductors are removed under other pay items.

T.264.3.2 SEQUENCING.

(1) Do not remove the junction box until new circuitry is available for use or temporary lighting is in place.

END OF SECTION T.264

SECTION T.265 CAST JUNCTION BOX

T.265.1 GENERAL

T.265.1.1 DESCRIPTION

This work is the furnishing and installation of cast aluminum, cast iron, or welded steel plate pull boxes size 18” x 8” x 6”, and a wall thickness of at least 5/16”, with all Mounting/support brackets and fastening devices, for use with Lighting Conduit System as indicated on the plans, as specified herein, and as directed by the Engineer.

T.265.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. Pennsylvania Department of Transportation Specifications, Publication 408, 2016 Edition, Change No. 5, Section 910.
Also Section 1101.10(a) – Junction Boxes

T.265.1.3 SUBMITTALS

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for Junction Boxes.

(2) Certification. Submit certification that the Junction boxes conform to the specified requirements:

T.265.2 MATERIALS

Watertight NEMA 4 Cast aluminum with anodized finish, cast iron or welded steel plate junction boxes, hot-dip galvanized after fabrication with mounting brackets and external mounting lugs. Provide two integrally cast mounting lugs on the two long sides. Provide stainless steel mounting hardware with aluminum junction boxes.

T.265.3 METHOD OF CONSTRUCTION

A. Obtain acceptance of any change in box location before installation.

B. Install junction boxes as shown on the plans. Terminate all conduits with water tight fittings.

END OF SECTION T.265

SECTION T.266 LIGHTING POLE FOUNDATION, TYPE FC

T.266.1 GENERAL

T.266.1.1 DESCRIPTION

This work is the excavation, construction and backfilling of a concrete foundation with anchor bolts for lighting poles.

T.266.1.2 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings
B. PennDOT Standard Drawings, Publication 72M, RC-80M
C. PennDOT Specifications, Publication 408/2016-5, Section 910.2, 704, and 1101

T.266.1.3 SUBMITTALS

At least ten (10) days prior to beginning work, submit shop drawings to the DRPA for approval, showing the dimensions and fabrication details for the Lighting Pole Foundation, Type FC.

Certification: Submit certification that the following products conform to the specified requirements:

Anchor Bolts

T.266.2 MATERIALS

Conform to requirements of PennDOT Specifications, Publication 408/2016-5. Including:

(1) Section 704 - Concrete, Class A

(2) Section 1101.04 - Galvanized Anchor Bolts, Nuts and Washers

T.266.3 METHOD OF CONSTRUCTION

(1) Pole Foundation. Form and construct of Class A Concrete and reinforcement steel, as specified in the applicable parts of Section 704 and Section 709 and PennDOT Standard Drawing RC-80M.

Mix, cure and test samples of the foundation concrete, in accordance with Authority procedures.

Provide and place anchor bolts perpendicular to the top plane of the foundation, extending above the foundation. Use suitable templates or forms to hold the anchor bolts in position while placing concrete.

Thoroughly clean the exposed portion of the anchor bolts and associated hardware.

Install individual electrical grounds for pole foundations. Where the resistance between pole and ground is greater than 25 ohms, install additional ground rods, as required.

(2) Backfill excavated spaces around the foundation with acceptable embankment material. Satisfactorily dispose of unsuitable and surplus materials.

END OF SECTION T.266

SECTION T.267 LIGHTING POLE FOUNDATION REMOVAL

T.267.1 GENERAL

T.267.1.1 DESCRIPTION

This work shall consist of removal and disposal of existing Lighting Pole Foundations as specified herein and restoring area as directed by the Engineer.

T.267.2 MATERIALS

None.

T.267.3 METHOD OF CONSTRUCTION:

T.267.3.1 General

At the appropriate time in the construction sequence, prepare the indicated Lighting Pole Foundation for removal. Disconnect the conduit and conductors. Remove the existing electrical conductors and light pole.

Remove the Lighting Pole Foundation and dispose of off-site. Fill the cavity from the removal with suitable on-site material and restore to match existing surrounding conditions.

Also, Remove the Existing conduit if not being utilized as part of this contract.

Direct buried conductors are removed under other pay items.

T.267.3.2 SEQUENCING.

(1) Do not remove the junction box until new circuitry is available for use or temporary lighting is in place.

END OF SECTION T.267

SECTION T.268 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE S INCLUDING 113 WATT LED LUMINAIRE TYPE II DISTRIBUTION

T.268.1 GENERAL

T.268.1.1 DESCRIPTION:

This work is the furnishing and erection of:

A. Aluminum lighting pole with Tenon top, Manufacturer installed internal damper, breakaway transformer base with ABS Plastic door, as depicted on the contract plans.
B. 113 Watt LED Galleon Luminaire with adjustable slip fitter mount, 3000K, Cooper Catalog # GAN-AF-02-LED-U-T4W-AP-AD JS-7030-3.
C. Also includes removal and delivery of existing pole to DRPA storage yard.

T.268.1.2 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit material, construction and manufacturer's certification that the products as described above conform to the specified requirements for load test.

T.268.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
1. Section 705 - Joint Material
2. Sections 910 and 1101 - Highway Lighting

T.268.2 MATERIALS

PennDOT Specifications, Publication 408/2016-5,
1. Section 1101.02 - Poles and Bases
2. Section 705.8 - Caulk Compound
3. Section 1101.06 - Luminaires

Equip luminaires with integral multivolt ballasts.

Aluminum lighting pole with Tenon top, Manufacturer installed internal damper.

Provide a cast aluminum transformer base with ABS plastic door suitable for each breakaway lighting pole.

T.268.3 METHOD OF CONSTRUCTION

T.268.3.1 Lighting Poles and Accessories. Install poles plumb. Use aluminum shims with aluminum bases; use stainless steel shims with other bases. Place shims under no more than three bolts of any base. If required by the Engineer: Caulk with compound between the pole and the concrete foundation or leveling pad.

Unless otherwise indicated, install Tenon Assembly at right angles to the pavement edge with assembly securely fastened to the pole shafts. Install luminaires and ballasts, in accordance with the manufacturer's instructions, or as directed.

Provide No. 10 AWG wire to the luminaire per PennDOT standard drawings.

DO NOT INSTALL LIGHTING POLE WITHOUT LUMINAIRE AND INTERNAL DAMPER.

Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on the pole top or arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

Fasten identification plate and pole numbers to the roadway side of the pole, as directed in plan set.

Select one or more poles for the static load test, described in PennDOT Publication 408/2016-5, Section 1101.02, for compliance before the remainder of the poles are erected.

Within the same general area, use similar pole types and similar materials.

Field-welding of poles or accessories will not be permitted.

Existing pole will be removed from site. Each pole will be delivered with all its parts packaged and labeled as directed by the Engineer.

Keep each pole and all of its parts separate from other poles. The Contractor shall take careful precautions not to damage any of the parts of each pole. If the pole or any of its parts become damaged while under the Contractor’s care, the Contractor is responsible to provide new parts to replace the damaged ones.

END OF SECTION

SECTION T.269 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE A INCLUDING 113 WATT LED LUMINAIRE TYPE II DISTRIBUTION

T.269.1 GENERAL

T.269.1.1 DESCRIPTION:

This work is the furnishing and erection of:

A. Aluminum lighting pole with Tenon top, Manufacturer installed internal damper, hand hole door, vibration pad, and Fabreeka washers for pole base, as depicted on the plans.
B. 113 Watt LED Galleon Luminaire with adjustable slip fitter mount, 3000K, Cooper Catalog # GAN-AF-02-LED-U-T4W-AP-AD JS-7030-3
C. Also includes removal and delivery of existing pole to DRPA storage yard.

T.269.1.2 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit material, construction and manufacturer's certification that the following products conform to the specified requirements for load test.

T.269.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
1. Section 705 - Joint Material
2. Sections 910 and 1101 - Highway Lighting

T.269.2 MATERIALS

PennDOT Specifications, Publication 408/2016-5,
1. Section 1101.02 - Poles and Bases
2. Section 705.8 - Caulk Compound
3. Section 1101.06 - Luminaires

Equip luminaires with integral multivolt ballasts.

Aluminum lighting pole with Tenon top, Manufacturer installed internal damper.

T.269.3 METHOD OF CONSTRUCTION

T.269.3.1 Lighting Poles and Accessories. Install poles plumb. Use aluminum shims with aluminum bases; use stainless steel shims with other bases. Place shims under no more than three bolts of any base. If required by the Engineer: Caulk with compound between the pole and the concrete foundation or leveling pad**.**

Unless otherwise indicated, install Tenon Assembly at right angles to the pavement edge with assembly securely fastened to the pole shafts. Install luminaires and ballasts, in accordance with the manufacturer's instructions, or as directed.

Provide No. 10 AWG wire to the luminaire per PennDOT standard drawings.

DO NOT INSTALL LIGHTING POLE WITHOUT LUMINAIRE AND INTERNAL DAMPER.

Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on the pole top or arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

Fasten identification plate and pole numbers to the roadway side of the pole, as directed in plan set.

Select one or more poles for the static load test, described in PennDOT Publication 408/2016-5, Section 1101.02, for compliance before the remainder of the poles are erected.

Within the same general area, use similar pole types and similar materials.

Field-welding of poles or accessories will not be permitted.

Existing pole will be removed from site. Each pole will be delivered with all its parts packaged and labeled as directed by the Engineer.

Keep each pole and all of its parts separate from other poles. The Contractor shall take careful precautions not to damage any of the parts of each pole. If the pole or any of its parts become damaged while under the Contractor’s care, the Contractor is responsible to provide new parts to replace the damaged ones.

END OF SECTION

SECTION T.270 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE S, INCLUDING 113 WATT LED LUMINAIRE TYPE III DISTRIBUTION

T.270.1 GENERAL

T.270.1.1 DESCRIPTION:

This work is the furnishing and erection of:

A. Aluminum lighting pole with Tenon top, Manufacturer installed internal damper, breakaway transformer base with ABS Plastic door, as depicted on the contract plans.
B. 113 Watt LED Galleon Luminaire with adjustable slip fitter mount. 4000K, Cooper Catalog # GAN-AF-02-LED-U-T4W-AP-AD JS-3
C. Also includes removal and delivery of existing pole to DRPA storage yard.

T.270.1.2 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit material, construction and manufacturer's certification that the following products conform to the specified requirements for load test.

T.270.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
1. Section 705 - Joint Material
2. Sections 910 and 1101 - Highway Lighting

T.270.2 MATERIALS

PennDOT Specifications, Publication 408/2016-5,
1. Section 1101.02 - Poles and Bases
2. Section 705.8 - Caulk Compound
3. Section 1101.06 - Luminaires

Equip luminaires with integral multivolt ballasts.

Aluminum lighting pole with Tenon top, Manufacturer installed internal damper.

Provide a cast aluminum transformer base with ABS plastic door suitable for each breakaway lighting pole.

T.270.3 METHOD OF CONSTRUCTION

T.270.3.1 Lighting Poles and Accessories. Install poles plumb. Use aluminum shims with aluminum bases; use stainless steel shims with other bases. Place shims under no more than three bolts of any base. If required by the Engineer: Caulk with compound between the pole and the concrete foundation or leveling pad.

Unless otherwise indicated, install Tenon Assembly at right angles to the pavement edge with assembly securely fastened to the pole shafts. Install luminaires and ballasts, in accordance with the manufacturer's instructions, or as directed.

Provide No. 10 AWG wire to the luminaire per PennDOT standard drawings.

DO NOT INSTALL LIGHTING POLE WITHOUT LUMINAIRE AND INTERNAL DAMPER.

Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on the pole top or arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

Fasten identification plate and pole numbers to the roadway side of the pole, as directed in plan set.

Select one or more poles for the static load test, described in PennDOT Publication 408/2016-5, Section 1101.02, for compliance before the remainder of the poles are erected.

Within the same general area, use similar pole types and similar materials.

Field-welding of poles or accessories will not be permitted.

Existing pole will be removed from site. Each pole will be delivered with all its parts as directed by the Engineer.

Keep each pole and all of its parts separate from other poles. The Contractor shall take careful precautions not to damage any of the parts of each pole. If the pole or any of its parts become damaged while under the Contractor’s care, the Contractor is responsible to

provide new parts to replace the damaged ones.

END OF SECTION

SECTION T.271 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE A INCLUDING 113 WATT LED LUMINAIRE TYPE III DISTRIBUTION

T.271.1 GENERAL

T.271.1.1 DESCRIPTION:

This work is the furnishing and erection of:

A. Aluminum lighting pole with Tenon top, Manufacturer installed internal damper, hand hole door, vibration pad, and Fabreeka washers for pole base, as depicted on the plans.
B. 113 Watt LED Galleon Luminaire with adjustable slip fitter mount, 4000K, Cooper Catalog # GAN-AF-02-LED-U-T4W-AP-AD JS-3
C. Also includes removal and delivery of existing pole to DRPA storage yard.

T.271.1.2 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit material, construction and manufacturer's certification that the following products conform to the specified requirements for load test.

T.271.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
1. Section 705 - Joint Material
2. Sections 910 and 1101 - Highway Lighting

T.271.2 MATERIALS

PennDOT Specifications, Publication 408/2016-5,
1. Section 1101.02 - Poles and Bases
2. Section 705.8 - Caulk Compound
3. Section 1101.06 - Luminaires

Equip luminaires with integral multivolt ballasts.

Aluminum lighting pole with Tenon top, Manufacturer installed internal damper.

Provide a cast aluminum transformer base with ABS plastic door suitable for each breakaway lighting pole.

T.271.3 METHOD OF CONSTRUCTION

T.271.3.1 Lighting Poles and Accessories. Install poles plumb. Use aluminum shims with aluminum bases; use stainless steel shims with other bases. Place shims under no more than three bolts of any base. If required by the Engineer: Caulk with compound between the pole and the concrete foundation or leveling pad.

Unless otherwise indicated, install Tenon Assembly at right angles to the pavement edge with assembly securely fastened to the pole shafts. Install luminaires and ballasts, in accordance with the manufacturer's instructions, or as directed.

Provide No. 10 AWG wire to the luminaire per PennDOT standard drawings.

DO NOT INSTALL LIGHTING POLE WITHOUT LUMINAIRE AND INTERNAL DAMPER.

Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on the pole top or arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

Fasten identification plate and pole numbers to the roadway side of the pole, as directed in plan set.

Select one or more poles for the static load test, described in PennDOT Publication 408/2016-5, Section 1101.02, for compliance before the remainder of the poles are erected.

Within the same general area, use similar pole types and similar materials.

Field-welding of poles or accessories will not be permitted.

Existing pole will be removed from site. Each pole will be delivered with all its parts as directed by the Engineer.

Keep each pole and all of its parts separate from other poles. The Contractor shall take careful precautions not to damage any of the parts of each pole. If the pole or any of its parts become damaged while under the Contractor’s care, the Contractor is responsible to

provide new parts to replace the damaged ones.

END OF SECTION

SECTION T.272 2” DIRECT BURIAL CONDUIT

T.272.1 GENERAL

T.272.1.1 DESCRIPTION

This work shall consist of furnishing and installing 2inch conduit, as indicated on the contract drawings, and includes excavation of trench, installation of conduit, back fill and compaction of trench as specified herein and as directed by the Engineer.

T.272.1.2 SUBMITTALS

A. At least ten (10) days before beginning the installation, submit the Manufacturer’s printed product information/cut-sheet for DRPA approval indicating material characteristics and performance criteria.

B. Certification. Submit certification that the following products conform to the specified requirements:
   i. Conduit

T.272.1.3 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings;

B. PennDOT Specifications, Publication 408/2016-5:
   1. Sections 910.3, 1101.09, and 1104.05 (a).

T.272.2 MATERIALS

PennDOT Specifications, Publication 408/2016-5,
1. Section 1101.09 - Conduit

T.272.3 METHOD OF CONSTRUCTION

T.272.3.1

1. Excavate a trench for the conduit. Install the conduits and splice together, and terminate conduits in junction boxes or foundations. Anchor the conduits into position and backfill with sand around the conduits as indicated on the plans. Backfill and compact in12 inch lifts.

2. Conduits. Support conduits firmly and rigidly in place by acceptable methods, in a manner to prevent dislodging, while placing concrete or while performing other operations. Where conduits cross the roadway, if possible, install conduits under roadways before placing the pavement. If this is not possible, install a 3-inch diameter or larger, rigid steel conduit for a sleeve. To install

this sleeve, jack, auger, or bore under pavements, shoulders, sidewalks, and other areas where directed. Extend this sleeve under the roadway approximately 2 feet beyond the outside paved edge. Place the lighting conduit through this sleeve.

3. Grind the cut ends of metallic conduit to remove rough edges. Do not use defective conduit. Thread steel conduit for couplings and fittings. Immediately prior to assembly, coat threaded parts with dull red primer. Wipe clean after assembly.

4. Weld plastic conduit joints with solvent, in accordance with the conduit manufacturer's recommendations.

5. Make conduit bends and offsets, either in the shop or in the field. When making bends and offsets, do not damage the protective coating. Do not reduce the interior diameter of the bend. Form the bend on a radius at least 12 times the conduit diameter, but not less than 18 inches. Use manufactured sweep bends whenever possible.

6. If conduit work is temporarily suspended, satisfactorily seal the ends of partially installed conduit runs. If necessary to open ends for cleaning or testing, reseal them upon completion. Seal conduits in control cabinets.

7. Either paint or tape exposed portions of concrete-encased steel conduit to be placed underground. Either paint with two coats of Protective Coating for Conduits or cover with tape, spirally wrapped with a minimum of overlap, after applying a primer. Do either, in accordance with the manufacturer's instructions.

8. Clean conduit runs after installation by pulling a stiff wire brush, the size of the conduit, through the conduit. Then, test the conduit by pulling a ball mandrel, having a diameter of at least 85% of the inside diameter of the conduit, through each conduit run. Where the mandrel fails to pass, either clean the conduit without injury to the conduit walls or replace the conduit.

9. Securely fasten the conduits to electrical equipment using devices acceptable for the conduit used.

10. Use a watertight conduit fitting for each conduit connected to watertight enclosures.

11. Do not install pull wires in the conduit, until approved by the Engineer.

END OF SECTION

SECTION T.273 2" PVC COATED RIGID STEEL CONDUIT

T.273.1 GENERAL

T.273.1.1 DESCRIPTION

This work is the furnishing and installation of exposed conduits on the CSX retaining wall.

T.273.1.2 SUBMITTALS

At least ten (10) days prior to beginning work, submit shop drawings to the DRPA for approval,

T.273.1.3 QUALITY ASSURANCE

Conform to the following:

PennDOT Specifications, Publication 408/2016-5:
1. Section 910 - Highway Lighting

T.273.2 MATERIALS

T.273.2.1 PennDOT Specifications, Publication 408/2016-5:
1. Sections 910 and 1101 - Highway Lighting

Conduit shall have a 40 mil Polyvinyl Chloride (PVC) exterior coating permanently fused to the hot-dipped galvanized steel conduit, and a red urethane interior coating to the interior of the conduit, as manufactured by Robroy Industries.

T.273.3 METHOD OF CONSTRUCTION

T.273.3.1 Apply a clear urethane coating to conduit threads before and after installation. Furnish and install hot-dipped, galvanized steel, PVC coated elbows, couplings and fittings for conduit connections.

Bend conduit with appropriate PVC coated Hickey. Apply with a manufacturer recommended touch-up compound to all scratches, scars and cuts to the conduit exterior coating.

Provide hot-dipped galvanized steel, PVC coated manufacturer approved supports and hardware for conduit mounting under the bridge structures. Provide pull boxes or conduit bodies to facilitate wire pulling. Provide water-tight fittings to all conduit connections to boxes.

Furnish and install Robroy manufacturer approved expansion/deflection fittings for conduits at each abutment and at each expansion joint of the bridge structures. Install at least one expansion/deflection fittings between each run of conduit between junction boxes.

END OF SECTION

SECTION T.274 LIGHTING POLE REMOVAL

T.274.1 GENERAL

T.274.1.1 DESCRIPTION

This work is to remove a Light pole, mast arm, luminaire, connector kit and wiring. Foundation will remain without a light pole. Install cap to seal conduit. Cap shall be made of same material as the existing conduit.
Also includes removal and delivery of existing pole to DRPA storage yard.

T.274.1.2 SUBMITTALS

None

T.274.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.274.2 MATERIALS

T.274.2.1 Conduit Cap

Must meet requirement as specified:

PennDOT Specifications, Publication 408/2016-5:

T.274.3 METHOD OF CONSTRUCTION

T.274.3.1 At the appropriate time in the construction sequence, prepare the indicated Lighting Pole for removal. Disconnect the conductors.
Remove the existing electrical conductors and light pole.
Cap existing conduit.
Deliver the removed light pole with all accessories to the DRPA storage yard.

END OF SECTION

SECTION T.275 COMPLETE POWER SUPPLY SYSTEM WITH 12” SKIRT, AM-3A

T.275.1 GENERAL

T.275.1.1 DESCRIPTION:

This work is the provision of a complete supply of electrical power to the highway lighting system for the highway area of this contract. This work includes providing electrical services and lighting controllers with 12”skirt, for AM-3A as indicated. This work also includes removing the existing AM-3A Cabinet and delivering it and all its components to the DRPA storage yard.
Also included under this item are any temporary Lighting necessary to maintain the existing and proper lighting conditions.

T.275.1.2 COORDINATION WITH UTILITY:

Complete agreement with the Philadelphia Electric Company is required in order to connect the new roadway lighting system to the existing electric power.

T.275.1.3 STANDARDS

A. As required by Utility Company, NEC and Local Regulations.

T.275.1.4 SUBMITTALS

1. Submit electrical drawings, wiring schematics and descriptive information for the power distribution specified herewith.
2. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.
3. Certification. Submit certification that all components conform to the specified requirements.

T.275.1.5 QUALITY ASSURANCE

All work shall conform to the following:

Contract Plans and
Reference Standards:

A. PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting
B. ASTM Standards
ASTM A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

T.275.2 MATERIALS

T.275.2.1 PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.275.3 METHOD OF CONSTRUCTION

T.275.3.1 GENERAL:

Acquire permits and certificates of approval from the appropriate agencies to be submitted to the Engineer prior to the start of work.

Provide electric connection to the highway lighting conductors wherever required.

This work also includes removing the existing AM-3A Cabinet and delivering it and all its components to the DRPA storage yard.

Also included under this item are any Temporary Lighting necessary to maintain the existing and proper lighting conditions.

All equipment manuals and wiring diagrams shall be turned over to the DRPA.

T.275.3.2 POWER SUPPLIES. Make arrangements with the local electric utility company for electrical service for the lighting system.

Furnish and install the necessary equipment such as cabinet with skirt, meter base, lightning arresters, conduit, insulators, switches, panelboards, circuit breakers, transformers, contactors, photoelectric controls, enclosures, and grounding to provide complete electrical services for the entire lighting system. Components of the complete power supply system to be furnished and installed will be subject to review and acceptance.

T.275.3.3 GROUNDING. Install a separate, insulated, continuous, grounding conductor with the circuit conductors. Use a grounding conductor of the same AWG size and material as the circuit conductors. Suitably ground lighting poles, junction boxes, cabinets, and enclosures by connecting to the continuous grounding conductor. Adequately connect the grounding conductor to the ground bus or to existing ground rod(s) of the existing power supply. Install 1" x 10' long copper clad steel ground rod(s) for the existing power supply.

T.275.3.4 PHOTOELECTRIC CONTROL DEVICE. Using a plug-in device, for ease of replacement. Install the device with its detector area facing north.

T.275.3.5 GALVANIZE REPAIR. Satisfactorily repair field damage to any galvanized finishes by painting with two coats of Zinc Dust-Zinc Oxide Paint, in accordance with ASTM A780, or with an acceptable equal.

T.275.3.6 ENCLOSURE INSTALLATION. Securely mount enclosures for housing the control equipment. Padlock the enclosures.

T.275.3.7 T.245.3.3 CONTRACTOR/MANUFACTURER WARRANTY

A. The Contractor shall warrant to the DRPA that all materials and equipment furnished under this Contract shall be new and approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.

The Contractor shall perform the satisfactory in-service operation of all mechanical and electrical equipment, and related components of the entire lighting system for a period of one year, beginning the following day after all lighting system related work is completed, the lighting system is in full operation, as so determined by the Engineer and the 168-hour performance test, as specified in Section T.281 has been satisfactorily completed.

The energy cost during the guarantee period will be borne by the Authority. Perform the following at the onset of and during the guarantee period:

B. All work not conforming to these standards may be considered defective.

C. The Contractor shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.

D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.

E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

F. If, during final inspection by the DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the DRPA, a second inspection shall be made following correction, and the one (1) year guarantee shall run from the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in writing.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

H. The DRPA reserves the right to immediately affect both temporary and permanent repairs, or arrange for others to affect such repairs, if the DRPA determines that an emergency situation is presented by the Contractor's defective work or materials. Such temporary and permanent repairs shall be at the expense of the Contractor, and the Contractor agrees that in such event the DRPA shall be reimbursed by the Contractor or by its surety.

I. All Manufacturer’s Warranties shall be turned over to the DRPA.

END OF SECTION

SECTION T.277 AWG #6, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

T.276.1 GENERAL

T.276.1.1 DESCRIPTION

This work is the furnishing and installation of electrical conductors for roadway lighting system, which includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.276.1.2 SUBMITTALS

Product Data.
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

Conductor

Certification.
Submit certification that the following products conform to the specified requirements:

Conductor

T.276.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing association and that is acceptable to authorities having jurisdiction.
    1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Section T.18.3.4.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with NFPA 70.

T.276.2 MATERIALS

T.276.2.1 Cable - Section 1101.08

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.276.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.
   5. Anaconda
   6. National
   7. Or DRPA Approved Equal.

B. Refer to Section T.274.3.1 "Conductor and Insulation Applications" for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC .

T.276.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.
   6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.276.3 METHOD OF CONSTRUCTION

T.276.3.1 T.18.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces:
Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade:
Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits:
Type THHN-THWN, in raceway.

F. Class 2 Control Circuits:
Type THHN-THWN, in raceway.

T.276.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

T.276.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than spliced conductors.
1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.276.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:

Testing: Perform the following field quality-control testing:
1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION T.277 AWG #8, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

T.277.1 GENERAL

Conform to requirements of Section T.276.

END OF SECTION

SECTION T.278 COMPLETE POWER SUPPLY SYSTEM WITH 12” SKIRT

T.278.1 GENERAL

T.278.1.1 DESCRIPTION:

This work is the provision of a complete supply of electrical power to the highway lighting system for the highway area of this contract. This work includes providing electrical services and lighting controllers WITH 12’ SKIRT, for: AM-1, AM-2, AM-3 and AM-4 as indicated. This work also includes removing the existing AM Cabinets and delivering it and all its components to the DRPA storage yard.
Also included under this item are any temporary Lighting necessary to maintain the existing and proper lighting conditions.

T.278.1.2 COORDINATION WITH UTILITY:

Complete agreement with the Philadelphia Electric Company is required in order to connect the new roadway lighting system to the existing electric power.

T.278.1.3 STANDARDS

A. As required by Utility Company, NEC and Local Regulations.

T.278.1.4 SUBMITTALS

1. Submit electrical drawings, wiring schematics and descriptive information for the power distribution specified herewith.
2. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.
3. Certification. Submit certification that all components conform to the specified requirements.

T.278.1.5 QUALITY ASSURANCE

All work shall conform to the following:

Contract Plans and
Reference Standards:

A. PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting
B. ASTM Standards
ASTM A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

T.278.2 MATERIALS

T.278.2.1 PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.278.3 METHOD OF CONSTRUCTION

T.278.3.1 GENERAL:

Acquire permits and certificates of approval from the appropriate agencies to be submitted to the Engineer prior to the start of work.

Provide electric connection to the highway lighting conductors wherever required.

T.278.3.2 POWER SUPPLIES. Make arrangements with the local electric utility company for electrical service for the lighting system.

Furnish and install the necessary equipment such as cabinet with skirt, meter base, lightning arresters, conduit, insulators, switches, panelboards, circuit breakers, transformers, contactors, photoelectric controls, enclosures, and grounding to provide complete electrical services for the entire lighting system. Components of the complete power supply system to be furnished and installed will be subject to review and acceptance.

T.278.3.3 GROUNDING. Install a separate, insulated, continuous, grounding conductor with the circuit conductors. Use a grounding conductor of the same AWG size and material as the circuit conductors. Suitably ground lighting poles, junction boxes, cabinets, and enclosures by connecting to the continuous grounding conductor. Adequately connect the grounding conductor to the ground bus or to existing ground rod(s) of the existing power supply. Install 1" x 10' long copper clad steel ground rod(s) for the existing power supply.

T.278.3.4 PHOTOELECTRIC CONTROL DEVICE. Using a plug-in device, for ease of replacement. Install the device with its detector area facing north.

T.278.3.5 GALVANIZE REPAIR. Satisfactorily repair field damage to any galvanized finishes by painting with two coats of Zinc Dust-Zinc Oxide Paint, in accordance with ASTM A780, or with an acceptable equal.

T.278.3.6 ENCLOSURE INSTALLATION. Securely mount enclosures for housing the control equipment. Padlock the enclosures.

T.275.3.7 T.245.3.3 CONTRACTOR/MANUFACTURER WARRANTY

A. The Contractor shall warrant to the DRPA that all materials and equipment furnished under this Contract shall be new and approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.

The Contractor shall perform the satisfactory in-service operation of all mechanical and electrical equipment, and related components of the entire lighting system for a period of one year, beginning the following day after all lighting system related work is completed, the lighting system is in full operation, as so determined by the Engineer and the 168-hour performance test, as specified in Section T.281 has been satisfactorily completed.

The energy cost during the guarantee period will be borne by the Authority. Perform the following at the onset of and during the guarantee period:

B. All work not conforming to these standards may be considered defective.

C. The Contractor shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.

D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.

E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.

F. If, during final inspection by the DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the DRPA, a second inspection shall be made following correction, and the one (1) year guarantee shall run from the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in writing.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship or materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

H. The DRPA reserves the right to immediately affect both temporary and permanent repairs, or arrange for others to affect such repairs, if the DRPA determines that an emergency situation is presented by the Contractor's defective work or materials. Such temporary and permanent repairs shall be at the expense of the Contractor, and the Contractor agrees that in such event the DRPA shall be reimbursed by the Contractor or by its surety.

I. All Manufacturer’s Warranties shall be turned over to the DRPA.

END OF SECTION

SECTION T.279 SCADA CONTROLLER CABINET

T.279.1 GENERAL

T.279.1.1 DESCRIPTION

This work is furnishing and installing an individual stand-alone microprocessor based distributed control unit (DCU) in a controller cabinet at locations shown on the plans. The controllers will be connected together via a fiber optic LAN cable and will communicate with the existing Energy Net Control System. The controller cabinet, fiber optic cable, and interface to the Energy Net Control system are included in other items. The Controller will also be hookup to the adjoining Lighting controller (Complete Power Supply System) locations shown on the Contract Plans.

The Contractor shall furnish and check out and start-up a SCADA lighting control system. The new SCADA control panels will have controllers manufactured by the company of the DPA's existing SCADA control system. The new SCADA panels will be a fully integrated extension of the existing system communicating on the same networks with the same software. The new systems will be accessed via the DRPA's existing operating work stations (GUI). The addition to the SCADA system will include all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as called for in this specification. All components of the system – workstations (existing), application controllers, unitary controllers, etc. shall communicate using Ethernet at the workstation and network controller level and a two-wire free-form typology, RS-485, MSTP at the distributed SDCU level. Provide controls for the following:

Lighting, LUS, VSL and VMS monitoring and Control.

Except as otherwise noted, the control system shall consist of all Ethernet Network Controllers, Standalone Digital Control Units, workstations, software, sensors, transducers, relays, control panels, and other accessory equipment, along with a complete system of electrical interlocking wiring to fill the intent of the specification and provide for a complete and operable system.

The SCADA contractor shall review and study all drawings and the entire specification to familiarize contractor with the equipment and system operation and to verify the quantities and types of equipment to be provided.

When the SCADA system is fully installed and operational, the SCADA Contractor and representatives of the Owner will review and check out the system. At that time, the SCADA contractor shall demonstrate the operation of the system and prove that it complies with the intent of the drawings and specifications.

Provide services and manpower necessary for commissioning of system in coordination with the Electrical Contractor, and Owner's representative.

All work performed under this section of the specifications will comply with all codes, laws and governing bodies. If the drawings and/or specifications conflict with governing codes, the Contractor shall submit a proposal with appropriate modifications to the project to meet code restrictions. If this specification and associated drawings exceed governing code requirements, the specification will govern. The Contractor shall obtain and pay for all necessary construction permits and licenses.

T.279.1.2 SUBMITTALS

All shop drawings shall be prepared in Visio Professional or AutoCAD software. In addition to the drawings, the Contractor shall furnish a CD containing the identical information. Drawings shall be B size or larger.

Shop drawings shall include a riser diagram depicting locations of all controllers and workstations, with associated network wiring. Also included shall be individual schematics of each mechanical system showing all connected points with reference to their associated controller. Typicals will be allowed where appropriate.

Submittal data shall contain manufacturer's data on all hardware and software products required by the specification

Software submittals shall contain narrative descriptions of sequences of operation, program listings, point lists, and a complete description of the graphics, reports, alarms and configuration to be furnished with the workstation software. Information shall be bound or in a three-ring binder with an index and tabs.

Submit five (5) copies of submittal data and shop drawings to the Engineer for review prior to ordering or fabrication of the equipment. The Contractor prior to submitting shall check all documents for accuracy.

The Engineer will make corrections, if required, and return to the Contractor. The Contractor will then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Engineer and the submittals are fully approved.

T.279.1.3 QUALITY ASSURANCE

Do to the specific nature of the existing system in use at the DRPA bridges & serviced by Tri-m Group. The Contractor must submit for review & approval the follow:

The Contractor has:

10 years minimum of building automations systems, installing direct digital control building automation systems.

An installation office location within 25 miles of the project, with a 24/7 service center.

Must be an authorized distributor of the SCADA manufacturer's product.

Have a trained staff of application engineers, who have been certified by the manufacturer in the configuration, programing and service of the automation system

Have a trained staff of installers, start-up technicians and SCADA service technicians.

The Vendor for this item shall be TRI-M Building Automations Systems, Inc., 208 Gale Lane, Kennett Square, PA. This firm designed and installed the existing Energy Management System and existing local controllers and is the only qualified vendor for this item.

The Vendor shall guarantee that the equipment, software, and work furnished shall comply with these specifications, shall perform its functions adequately, and shall operate successfully and reliably without undue wear. The Vendor is to agree immediately to replace and install free of charge, any part that may break or fail by reason of defective material or workmanship within a period of one (1) year from the time of acceptance by the Authority. The Vendor will guarantee to maintain a supply of component parts for the expected life of the furnished unit.

T.279.2 MATERIALS

1 T.279.2.1

The Supervisory Control and Data Acquisition System (SCADA) shall be designed to provide interoperability between different subsystems. The system shall also provide a

graphical, interface that allows for instant access to any system through a standard browser.

The contractor must provide PC-based programming workstations, operator workstations and microcomputer controllers of modular design providing distributed processing capability and allowing future expansion of both input/output points and processing/control functions. Contractor must provide equipment from a single manufacturer designed specifically for building automation and shall submit the manufacturer's technical product information sheet for every controller model type that is used. Software installed on the workstation(s) shall be by the same manufacturer as the equipment and shall provide a fully integrated development environment to allow the user at the right security level to add controllers, add points, edit programming, create and edit graphics, reports, trends lists.

For this project the system shall consist of the following components:

1.1 Operator Workstation(s) (OWSs) (Existing).

The SCADA Contractor shall furnish Operator Workstation Computer(s) (OWS) and printer(s) and server(s) as listed in equipment schedule and as described in Part 2 of the specification. These workstations must be running the standard workstation software developed and tested by the manufacturer of the controllers. No third party front-end workstation software will be acceptable.

1.2 Ethernet-based Network Router and/or Controller(s) (NRCs) (Existing).

The SCADA Contractor shall furnish Ethernet-based network controllers as listed in equipment schedule and as described in Part 2 of the specification. These controllers will connect directly to the Operator Workstation over Ethernet at a minimum of 100mbps and provide communication to the Standalone Digital Control Units and/or other Input/Output Modules. Network controllers that utilize RS232 serial communications or ARCNET to communicate with the workstations will not be accepted.

1.3 Standalone Digital Control Units (SDCUs).

Provide the necessary quantity and types of SDCUs to meet the requirements of the project for mechanical equipment control including air handlers, central plant control, and terminal unit control. Each SDCU will operate completely standalone, containing all the I/O and programs to control its associated equipment.

T.279.3 METHOD OF CONSTRUCTION

(1) Conform with the National Electric Code and local, state, and federal code requirements as applicable.

(2) System hardware must be compatible with the existing Energy Net System at the Walt Whitman Bridge.

2 System Architecture

1. General

   The Supervisory Control and Data Acquisition System (SCADA) shall consist of Network Router/Controllers (NRCs), a family of Standalone Digital Control Units (SDCUs), Operator Workstations (OWSs), and File Server(s) to support system configurations. The SCADA shall provide control, alarm detection, scheduling, reporting and information management for the entire facility, and Wide Area Network (WAN) if applicable, from a single ODBC-compliant database.

   The system shall be designed with a top-level 10/100bT Ethernet network. A sub-network using two-wire, free from typology RS-485 MSTP protocol, shall connect the local, stand-alone controllers (SDCUs) with Ethernet-level controller/routers (NCRs).

2. Level 2 Network Description

   Level 2 of the system shall consist of one or more RS-485 MSTP field buses managed by the Network Router/Controllers. The Level 2 field bus consists of an RS485, token passing bus that supports up to 127 Standalone Digital Control Units (SDCUs) per port of the NRC for operation of HVAC equipment and lighting. In addition, wireless mesh communications shall be supported for the level 2 network.

3. SCADA LAN Segmentation

   The SCADA shall be capable of being segmented, through software, into multiple local area networks (LANs) distributed over a wide area network (WAN), sharing a single file server. This enables workstations to manage a single LAN (or building), and/or the entire system with all devices being assured of being updated by and sharing the most current database. In the case of a single workstation system, the workstation shall contain the entire database – with no need for a separate file server.

4. Standard Network Support

   All NRCs, Workstation(s) and File Server shall can reside directly on the owner's Ethernet TCP/IP LAN/WAN with no required gateways. Furthermore, the NRC's, Workstation(s) and File Server shall can use standard, commercially available, off-the-shelf Ethernet infrastructure components such as routers, switches and hubs. With this design the owner may utilize the investment of an existing or new enterprise network or structured cabling system. This also allows the option of the maintenance of the LAN/WAN to be performed by the owner's Information Systems Department as all devices utilize standard TCP/IP components.

5. System Expansion

   The SCADA system shall be scalable and expandable at all levels of the system using the same software interface, and the same Level 1 and Level 2 controllers. Systems that require replacement of either the workstation software or field controllers to expand the system shall not be acceptable.

6. Network Router/Controllers (NRCs)

7. General

Network Router Controllers shall combine both network routing functions and control functions into a single unit. NRC's shall route communications between the IP network and the RS-485 MSTP field network. They shall also be responsible for monitoring and controlling their own HVAC equipment such as an AHU or boiler. A sufficient number of NRCs shall be supplied to fully meet the requirements of this specification and the attached point list.

8. Fiber convertor

Industrial grade serial to fiber media convertor. The convertor shall convert RS-232/422/485 to dual fiber ports. Data transmission shall be up to 2 Km in multimode and up to 30 Km in single mode. The convertor secures Asynchronous Serial Data transmissions over EMI resistant fiber at speeds up to 1024Kbps. Built-in RS-485 auto detection feature, 8KV ESD protection and 2.5KV Isolation for serial data transmission protection; and 10 positions rotary switch for RS-422/485 Pull high/low feature.

3 Standalone Digital Control Units (SDCUs)

3.1 General:

Standalone Digital Control Units shall monitor or control any equipment that can sense a set of dry contacts, 0-10 vdc or 4-20ma signal or output a dry contact, 0-10 vdc or 4-20ma signal. Each controller shall be fully programmable, contain its own control programs and will continue to operate in the event of a failure or communication loss to its associated NRC. Each SDCU provided must be from the same SCADA Manufacturer and be fully custom programmable.

3.2 Memory:

Both the operating system of the controller, plus the application program for the controller, shall be stored in non-volatile, FLASH memory. Controllers shall contain enough memory for the current application, plus required history logging, plus a minimum of 20% additional free memory.

3.3 Communication Ports:

SDCUs shall have a RS-485 communication port to the RS-485 MSTP field bus.

3.4 Input/Output:

Each SDCU shall have enough inputs and outputs to meet the application's required point count. Each SDCU shall support universal inputs, whereas any input may be software-defined as:

Digital Inputs for status/alarm contacts
Counter Inputs for summing pulses from meters.
Thermistor Inputs for measuring temperatures in space, ducts and thermowells.
Analog inputs for pressure, humidity, flow and position measurements.

SDCU's must support both digital and analog output types:
Digital Outputs for on/off equipment control.
Analog Outputs for valve and damper position control, and capacity control of primary equipment.

3.5 Expandability:

For larger controllers (16 base inputs and up), provide input and output expansion using plug-in modules. At least two I/O modules must be capable of being added to the base SDCU.

3.6 Networking:

Each SDCU will be able to exchange information on a peer to peer basis with other Standalone Digital Control Units. Each SDCU shall be capable of storing and referencing global variables (on the LAN) with or without any workstations online. Each SDCU shall be able to have its program viewed and/or enabled/disabled through a workstation connected to an NRC.

3.7 Indicator Lamps:

SDCUs will have as a minimum, LED indication of CPU status, and field bus status.

3.8 Real Time Clock (RTC):

All SDCUs shall have a real time clock in either hardware or software. The accuracy shall be within 10 seconds per day. The RTC shall provide the following information: time of day, day, month, year, and day of week. Each SDCU shall receive a signal, every hour, over the network from the NRC, which synchronizes all SDCU real time clocks.

3.9 Automatic Restart After Power Failure:

Upon restoration of power, the SDCU shall automatically and without human intervention, update all monitored functions, resume operation based on current, synchronized time and status, and implement special start-up strategies as required.

3.10 Battery Back Up:

All SDCUs shall store all programming in non-volatile FLASH memory. All SDCUs except terminal controllers shall include an on-board lithium battery to back up the controller's RAM memory. The battery shall have a shelf life of over 10 years and provide accumulated backup of all RAM and clock functions for at least 3 years. In the case of a power failure, the SDCU shall first try to restart from the RAM memory. If that memory is corrupted or unusable, then the SDCU shall restart itself from its application program stored in its FLASH memory.

3.11 Software - General.

The SDCU shall contain FLASH memory to store both the resident operating system AND the application software. There will be no restrictions placed on the type of application programs in the system. Each SDCU shall be capable of parallel processing, executing all control programs simultaneously. Any program may affect the operation of any other program. Each program shall have the full access of all I/O facilities of the processor. This execution of control function shall not be interrupted

due to normal user communications including interrogation, program entry, printout of the program for storage, etc.

3.12 User Programming Language:

The application software shall be user programmable, using the same language as that defined for Network Router/Controllers. Controllers that use a “canned” program method will not be accepted.

Control Software, Mathematical Functions, and Energy Management Applications must be identical to that which is provided with the Network Router/Controller.

3.13 History Logging:

Each controller shall be capable of LOCALLY logging any input, output, calculated value or other system variable over user defined time intervals ranging from 1 second to 1440 minutes. Any system can be logged in history. A minimum of 1000 values shall be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.

3.14 Alarm Management:

For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms will be tested each scan of the SDCU and can result in the display of one or more alarm messages or reports.

Up to 8 alarms can be configured for each point in the controller.

Alarms will be generated based on their priority. A minimum of 255 priority levels shall be provided.

If communication with the Operator Workstation is temporarily interrupted, the alarm will be time-stamped and buffered in the controller. When communications return, the alarm will be transmitted to the Operator Workstation if the point is still in the alarm condition.

Alarms must be capable of being routed to any workstation.

Owner or the Owner’s Representative.

3.15 Code Compliance

All wiring shall be installed in accordance with all applicable electrical codes and will comply with equipment manufacturer's recommendations. Should any discrepancy be found between wiring specifications in Division 17 and Division 16, wiring requirements of Division 17 will prevail for work specified in Division 17.

3.16 Cleanup

At the completion of the work, all equipment pertinent to this contract shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this contract.

4 Hardware Installation

4.1 Installation Practices for Wiring

1. All controllers are to be mounted vertically and per the manufacturer's installation documentation.
2. The 120VAC power wiring to each Ethernet or Remote Site controller shall be a dedicated run, with a separate breaker. Each run will include a separate hot, neutral and ground wire. The ground wire will terminate at the breaker panel ground. This circuit will not feed any other circuit or device.
3. A true earth ground must be available in the building. Do not use a corroded or galvanized pipe, or structural steel.
4. Wires are to be attached to the building proper at regular intervals such that wiring does not droop. Wires are not to be affixed to or supported by pipes, conduit, etc.
5. Conduit in finished areas, will be concealed in ceiling cavity spaces, plenums, furred spaces and wall construction. Exception; metallic surface raceway may be used in finished areas on masonry walls. All surface raceway in finished areas must be color matched to the existing finish within the limitations of standard manufactured colors.
6. Conduit, in non-finished areas where possible, will be concealed in ceiling cavity spaces, plenums, furred spaces, and wall construction. Exposed conduit will run parallel to or at right angles to the building structure.
7. Wires are to be kept a minimum of three (3) inches from hot water, steam, or condensate piping.
8. Where sensor wires leave the conduit system, they are to be protected by a plastic insert.
9. Wire will not be allowed to run across telephone equipment areas.

4.1.1 Enclosures

For all I/O requiring field interface devices, these devices where practical will be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure which protects the device(s) from dust, moisture, conceals integral wiring and moving parts.

FIPs shall contain power supplies for sensors, interface relays and contactors, and safety circuits.

The FIP enclosure shall be of stainless-steel construction with a NEMA 4 rating with a hinged door. The enclosure will be sized for twenty percent spare mounting space.

All wiring to and from the FIP will be to screw type terminals. Analog or communications wiring may use the FIP as a raceway without terminating. The use of wire nuts within the FIP is prohibited.

The wiring within all enclosures shall be run in plastic track. Wiring within controllers shall be wrapped and secured.

Identification

1. All field enclosures, other than controllers, shall be identified with a nameplate.
2. Junction box covers will be marked to indicate that they are a part of the SCADA system.
3. All I/O field devices (except space sensors) that are not mounted within FIP's shall be identified with names that are the same as on the as-built drawings.
4. All I/O field devices inside FIP's shall be labeled with names that are the same as on the as-built drawings.

T. 279.3.1 ADDITIONAL SPECIFICATIONS

9. System Startup & Commissioning

10. Each point in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the SCADA will be tested against the appropriate sequence of operation specified herein. Successful completion of the system test shall constitute the beginning of the warranty period. A written report will be submitted to the owner indicating that the installed system functions in accordance with the plans and specifications.
11. The SCADA contractor shall commission and set in operating condition all equipment and systems, in the presence of the equipment manufacturer's representatives, as applicable, and the Owner and Architect's representatives.
12. The SCADA Contractor shall provide all manpower and engineering services required to assist the Electrical Contractor in testing, adjusting all systems. The SCADA Contractor shall have a trained technician available on request during the start-up of the systems.

13. Operating and Maintenance Manuals

14. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire SCADA. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the leadtime and expected frequency of use of each part clearly identified.
15. Following project completion and testing, the SCADA contractor will submit as-built drawings reflecting the exact installation of the system. The as-built documentation shall also include a copy of all application software both in written form and on diskette.

16. Warranty

17. The SCADA contractor shall warrant the system for 12 months after system acceptance and beneficial use by the owner. During the warranty period, the SCADA contractor shall be responsible for all necessary revisions to the software as required to provide a complete and workable system consistent with the letter and intent of the Sequence of Operation section of the specification.
18. Updates to the manufacturer's software shall be provided at no charge during the warranty period.

19. Training

1. Provide a minimum of sixteen (8) hours of on-site training for up to three (3) system operators. The training will be hands-on type at the owner's office. The training class will use the actual Operator's Manual that will be submitted for this project.

5

Work by Others

20. The Electrical Contractor shall provide:
    1. The installation of the equipment and panel furnished by this contractor.
    2. The wiring between the new lighting panel and SCADA panel.
    3. Start-up and check-out with this contactor.

21. Code Compliance

22. Provide SCADA components and ancillary equipment, which are UL-916 listed and labeled.
23. All equipment or piping used in conditioned air streams, spaces or return air plenums shall comply with NFPA 90A Flame/Smoke/Fuel contribution rating of 25/50/0 and all applicable building codes or requirements.
24. All wiring shall conform to the National Electrical Code.
25. Comply with FCC rules, Part 15 regarding Class A radiation for computing devices and low power communication equipment operating in commercial environments.
26. Comply with FCC, Part 68 rules for telephone modems and data sets.

SECTION T.280 TESTING OF ENTIRE POWER SUPPLY SYSTEM AND CONNECTIONS

T.280.1 GENERAL

T.280.1.1 DESCRIPTION

This work is the testing of the power supply system and connections for an AM Cabinet.

T.280.1.4 SUBMITTALS

Contractor to submit how they will perform their Testing procedures in written form.

T.280.2 MATERIALS

None

T.280.3 METHOD OF CONSTRUCTION

T.280.3.1 Tests:

Provide electrical energy for the following tests and furnish personnel and equipment required. Correct any defects disclosed by the tests. Perform the tests in the presence of an authorized representative of the Authority.

Record test data on the following PennDOT Test Forms:

Form Title	
4225A	Ground Rod Test
4225B	Conductor Insulation Test
4225C	Circuit Performance Test
4225D	Highway Illumination Test (Conv.)
4225F	High Mast Lighting
4225G	Static Load Test

(1) Ground Test.
Satisfactorily demonstrate the following:

Circuits are continuous and free from short circuits.

Circuits are free from unspecified grounds.

The resistance to earth-ground, for each ground rod installation, is not more than 25 ohms. If not met with one rod, supply and install additional ground rods until this requirement is met.

(2) Circuit Tests.

Take voltage readings, with load and without load, at the power supply side of the control cabinet main breaker. The readings with load are required to be within 3% of the actual supplied voltage.

Take voltage readings at the last light of each circuit. A voltage reading is acceptable if it is within 5% of the reading (with load) at the supply point.

Take current readings, with a full lighting load, on the load side of each distribution breaker in the control cabinet. A current reading is acceptable, if it does not exceed 75% of the breaker rating.

END OF SECTION

SECTION T.281 TESTING OF ENTIRE LIGHTING SYSTEM

T.281.1 GENERAL

T.281.1.1 DESCRIPTION

This work is the testing of the lighting system connected to an AM Cabinet.

T.281.1.2 QUALITY ASSURANCE

Tests. Provide electrical energy for the following tests and furnish personnel and equipment required. Correct any defects disclosed by the tests. Perform the tests in the presence of the Engineer.

T.281.2 MATERIALS

None.

T.281.3 METHOD OF CONSTRUCTION

T.281.3.1 Record test data on the following PennDOT Test Forms:

Form	Title
4225A	Ground Rod Test
4225B	Conductor Insulation Test
4225C	Circuit Performance Test
4225D	Highway Illumination Test (Conv.)
4225G	Static Load Test

(1) Ground Test. Satisfactorily demonstrate the following:

Circuits are continuous and free from short circuits.

Circuits are free from unspecified grounds.

The resistance to earth-ground, for each ground rod installation, is not more than 25 ohms. If not met with one rod, supply and install additional ground rods until this requirement is met.

(2) Circuit Tests. Take voltage readings, with load and without load, at the power supply side of the control cabinet main breaker. The readings with load are required to be within 3% of the actual supplied voltage.

Take voltage readings at the last light of each circuit. A voltage reading is acceptable if it is within 5% of the reading (with load) at the supply point.

Take current readings, with a full lighting load, on the load side of each distribution breaker in the control cabinet. A current reading is acceptable, if it does not exceed 75% of the breaker rating.

(3) Performance Test. Energize and operate the lighting system, including automatic control(s), for 168 consecutive hours. At each control cabinet, supply a service voltage graphic record covering the test period, with the installed electrical equipment in normal operation (lights on at night and off in day).

After the lights have been energized for at least 100 hours burning time, and after dark, take footcandle readings at road level. Use a light meter meeting the following requirements:

Lowest full scale, not exceeding 2.0 footcandles.

Calibrated by a recognized testing laboratory within the past year and bearing the certification of calibration.

Take these footcandle readings, where directed, record reading results, and submit to the Engineer. Give particular attention to points where low illumination is likely to occur, usually midway between luminaires.

END OF SECTION

SECTION T.282 TESTING OF ENTIRE SCADA SYSTEM

T.282.1 GENERAL

T.282.1.1 DESCRIPTION

This work is the testing of the expanded SCADA system to verify correct operation of all Energy Net Control System functions and proper operation of roadway lighting remote control per AM Cabinet.

T.282.1.2 QUALITY ASSURANCE

VERIFY THAT SYSTEM FUNCTIONS MEET ORIGINAL PERFORMANCE CRITERIA PER MANUFACTURER'S DATA.

T.282.2 MATERIALS

None

T.282.3 METHOD OF CONSTRUCTION

(1) Verify all new fiber optic cable used for the SCADA system meets manufacturer's data for transmission losses (dB loss) for the given length of run and system application.

(2) Verify proper operation of all Energy Net Control System and SCADA functions.

(3) Correct all deficiencies at no cost to DRPA.

END OF SECTION

SECTION T.283 LED PEDESTRIAN TUNNEL LUMINAIRE

T.283.1 GENERAL

T.283.1.1 DESCRIPTION

Remove Existing Fluorescent light fixtures and install new HD Outdoor, water proof rated LED light fixture in ceiling cavity of Pedestrian Tunnel. Also remove existing clear lens in Protective door of the ceiling cavity and install new clear polycarbonate lens same thickness as the existing lens.

T.283.1.2 SUBMITTALS

A. Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification. Submit material, construction and manufacturer's certification that the following products conform to the specified requirements.

T.283.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.283.2 MATERIALS

T.283.2.1 Provide a Linear LED Luminaire which meets the following:

Designed to match the footprint of traditional linear Fluorescent.
Shock and Vibration Resistant LED’s.
Operating Temperature Range : -35C to +55 degrees C.
Wet Locations.
At least 60 WATT.

polycarbonate clear lens of same thickness as existing.

T.283.3 METHOD OF CONSTRUCTION

T.283.3.1 Remove existing Fluorescent Fixture.
Install new LED Linear Luminaire.
Remove existing lens from tunnel ceiling cavity’s protective door.
Install new clear polycarbonate lens (same thickness as the existing lens).

END OF SECTION

SECTION T.284 SIGN LIGHTING 2 LED LUMINAIRES, STRUCTURE S-1

T.284.1 GENERAL

T.284.1.1 DESCRIPTION

This work is the electrification of lighted sign structure S-1 included in this project at location with Station as shown on the Contract Drawings.

This item is limited to the equipment, luminaires, disconnect cabinet, mounting hardware, conduit, grounding hardware, wire and any incidentals required to mount and energize luminaires on a sign structure and shop drawing submissions. Power to the sign structure is covered under other pay items.

T.284.1.2 SUBMITTALS

Product Data:

Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for items listed below.

Luminaire, Disconnect box equipment, conduit, mounting hardware, Grounding hardware, wire, Misc. parts.

Certification: Submit certification that the following products conform to the specified requirements:

Luminaire, Disconnect box equipment, conduit, mounting hardware, Grounding hardware, wire, Misc. parts

T.284.1.3 QUALITY ASSURANCE

All work shall conform to the following:
Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:

Sections 910 and 1101 - Highway Lighting
Section 1102 - Sign Lighting

T.284.2 MATERIALS

T.284.2.1 Materials

1. 2 Luminaires:
   Holophane Sign-Vue LED II
   Model # SVLED2 SVL PK3 MVOLT 50K PLM GYSDP IL
   SVLEDF1FUS10 SVLED2-ISL-BKTPLT RFD267025.

2. Sign Structure Disconnect Cabinet: NEMA IV Enclosure, Lock and Keys, with 2- 15 amp, 1 pole breakers and proper Grounding hardware, including ground rod.
3. Sign structure mounted rigid conduit & flex PVC coated steel conduit.
4. All wiring (AWG 10 TC cable) and mounting hardware necessary to properly install a 2 luminaire sign lighting system.

T.284.3 METHOD OF CONSTRUCTION

T.284.3.1 Coordinate with structure installation crew's schedule:

Furnish and install the necessary equipment such as Luminaires, conduit, conductors, circuit breakers, enclosures, Grounding hardware and any incidentals necessary, on or near sign structure to complete the electrical service from the junction box adjacent to the sign structure to the luminaires on the structure.

Luminaires.
Provide mounting brackets for luminaires on each sign at required spacing. Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on the mounting arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

END OF SECTION

SECTION T.285 SIGN LIGHTING 2 LED LUMINAIRES, CONRAIL TUNNEL STRUCTURE

T.285.1 GENERAL

T.285.1.1 DESCRIPTION

This work is the electrification of lighted Conrail Tunnel sign structure included in this project at location with Station as shown on the Contract Drawings.

Conform to requirements of Section T.284.

END OF SECTION

SECTION T.286 NOT USED

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SECTION T.287 ROADWAY TUNNEL (CSX-CONRAIL OVERPASS) LED LUMINAIRE LIGHTING SYSTEM

T.287.1 GENERAL

T.287.1.1 DESCRIPTION

Remove all existing: luminaires and conduit, mounting hardware, and wire.

Install new TunnelPass LED wall mounted luminaires (as shown on plan sheet LT-9), mounting hardware, PVC Coated steel conduit & Junction boxes-sized (same as existing), wiring (from AM-3A cabinet to Luminaires). Include any incidentals required to install a properly working system.

T.287.1.2 SUBMITTALS

Submit electrical drawings, wiring schematics and descriptive information.

Product Data:
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

Certification:
Submit certification that all components conform to the specified requirements.

T.287.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.287.2 MATERIALS

T.287.2.1 Luminaires:
PennDOT Specifications, Publication 408/2016-5, Section 1101.06
Equip luminaires with integral multivolt ballasts.
Holophane TunnelPass LED Model # TNLED 3 4K 7 AS WCR DGRA S DM TW
Holophane TunnelPass LED Model # TNLED 9 4K 1 AS WCR DGRA S DM TW

Wall Mounted Junction Boxes:
PennDOT Specifications, Publication 408/2016-5, Section 1101.10

Conduit:
PennDOT Specifications, Publication 408/2016-5, Section 1101.09.

40 mil Polyvinyl Chloride (PVC) exterior coating permanently fused to the hot-dipped galvanized steel conduit, and a red urethane interior coating to the interior of the conduit, as manufactured by Robroy Industries.

Cable (wiring):
PennDOT Specifications, Publication 408/2016-5, Section 1101.08

T.287.3 METHOD OF CONSTRUCTION

T.287.3.1

A. Remove existing wall mounted Luminaires, conduit, junction boxes, and wire from inside walls of Conrail tunnel.
B. Run new PVC coated steel conduits, wall mounted Junction boxes, and wire.
C. Install new TunnelPass LED wall mounted luminaires (as shown on plan sheet LT-10), with mounting hardware to provide maximum lighting to roadway
D. Provide drainage conduit at the low point of each conduit run.
E. Install expansion/deflection sleeves or couplings at each abutment and at each expansion joint of the structures for each conduit.
F. Apply a manufacturer approved coating to conduit threads before and after installation. Furnish and install hot-dipped, galvanized steel, PVC coated elbows, couplings and fittings for conduit connections as per Robroy manufacturer.
G. Bend conduit with an appropriate PVC coated Hickey. Apply with a manufacturer recommended touch-up compound to all scratches, scars and cuts to the conduit exterior coating.
H. Provide PVC coated, hot-dipped galvanized steel supports and hardware for conduit mounting under the bridge structures. Provide pull boxes or conduit bodies to facilitate wire pulling. Provide water-tight fittings to all conduit connections to boxes.
I. Furnish and install expansion/deflection fittings for conduits at each abutment and at each expansion joint of the bridge structures.
J. Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before mounting.
K. Uniformly adjust and level luminaires for maximum roadway lighting.
L. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.
M. Install any incidentals required to provide a properly working system.

END OF SECTION

SECTION T.288 LED 4 FLASHING CHEVRON SYSTEM

T.288.1 GENERAL

T.288.1.1 DESCRIPTION

Remove 4 electric flashing chevrons and wire, located next to the Eastbound side of the Conrail Roadway Tunnel (see Contract Drawings).
Install Control Cabinet and 4 LED Flashing Chevron signs 24"X30" with dimmer capabilities (which also can auto dim signs at night time) on to existing poles.
The SYSTEM shall include AC powered Assemblies of LED Flashing Chevron signs that run 24 hours a day. Components shall include:
LED Flashing Chevron Signs, Control Cabinet, Power Supply, Flash Controllers, and necessary pole mounting hardware.

This System shall consist of 4 warning indicators throughout the curve.
Working 24/7 all indications associated with the system shall sequentially commence operation within 120 msec, and shall cease operation synchronously.
The characteristics of the curve shall dictate the curve warning indicator flash pattern and timing that is programmed into each of the indicator controllers.
Curve warning indicators shall operate in a sequential pattern both to enhance the curve warning signage and to guide road traffic through the curve.

T.288.1.2 SUBMITTALS

Product Data:
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

Certification.
Submit certification that the following products conform to the specified requirements:

24" x 30" LED flashing Chevron signs, control cabinet, Power Supply, Flash Controllers, mounting hardware.

T.288.1.3 QUALITY ASSURANCE

All work shall conform to the following:
Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting
Section 1102 - Sign Lighting

T.288.2 MATERIALS

T.288.2.1 Manufacturer shall have a minimum of ten years of relevant intelligent traffic product manufacturing experience, as well as a minimum of three years of BlinkerSign manufacturing experience.
Shall be TAPCO DCWS Solar Warning system or approved equal
TAPCO
5100 West Brown Deer Road
Brown Deer, WI 53223
4-Blinker Signs, W1-8, 24"x30", Chevron, DG3, FY, 12 VDC, 10 Amb LEDs with dimmer capabilities.
Sign Mounting Kit, Banded, Flared Leg, Anti-Vandal for mounting One Flashing Chevron Sign to a large pole.
Control Cabinet, 277-120 VAC, wiring to 12DVC boxes.

LED Flashing Chevrons:

All signs shall conform to 2009 Federal Highway Administration's MUTCD section 2A.07 on retro-reflectivity and illumination. Each Sign shall have Day-Viz® LEDs that are mounted individually into holes around the perimeter of the sign and shall be ultrasonically welded to the sign assembly to provide maximum strength and rigidity. Each sign blank material shall be a minimum of 0.080" thick aluminum. Each sign face shall consist of 3M™ Diamond Grade™ DG3 reflective sheeting applied to the sign blank with a 3M™ 1160 Premium Protective Overlay film to provide an additional layer of graffiti protection.
Each LED Flashing Chevron shall have ten quantity high power, 1 watt LEDs with a viewing angle of 15°. It shall be the size and color per the requirements and have the required MUTCD compliant W1-8 legend.
Size shall be 24" x30" which is specified in the plans
Have each LED sealed within a 7/8" diameter, heat-dissipating plastic enclosure to provide resistance to weather and vibration
Have the LEDs wired in strings to activate simultaneously per MUTCD standards.
Have the LEDs wired in parallel electrically so that remaining LEDs continue to flash in the event of the failure of an individual LED.
Wiring between LEDs shall be encapsulated inside 1" x 3/8" aluminum extrusions secured to the back of each sign assembly, to provide weather resistance and protection.
Each sign shall have two holes for mounting to a post or pole and vandal resistant fasteners to mount the LED sign assembly to a pole or post.
UV resistant label(s) shall be applied to the back of each sign assembly and shall include specific information such as the manufacturer, manufacturer phone

number, model number, serial number, date of manufacture, and any applicable regulatory compliance information.

Control Cabinet:

The control cabinets shall be NEMA 3R Type. Each control cabinet houses the Flash Controller with Universal Switching Power Supply, fusing, and external component terminal block connections.
The Main Cabinet shall be 15" tall, 12.5" wide and 9.9" deep and constructed of minimum 0.080" thick aluminum. To promote airflow for internal components, the cabinet shall be vented with screening included on all vents and drains to prevent insects and other foreign matter from entering. For security, the cabinet must include at least two tamper-resistant stainless steel hinges and a replaceable #2 traffic lock with keys. To facilitate maintenance or repairs, the cabinet shall include a removable control panel to which all control circuit components either mount or connect.
To prevent corrosion, all materials used in the construction or mounting of the control cabinet shall be either aluminum or stainless steel. Anti-vandal mounting hardware shall be available as an option.
A UV resistant label shall be applied to the exterior of the cabinet and include system specific information including model number, serial number, date of manufacture, as well as any applicable regulatory compliance information.

Universal Switching Power Supply:

The Universal Switching Power Supply shall:

- Accept a universal AC input, 100-277VAC, 50/60 hz
- Output 12 VDC regulated to +/- 1%
- Have Short Circuit, Overload and Over Voltage protection

Pole Mounting Hardware:

- Shall be provided for mounting all system components to existing poles..
- All fasteners shall be stainless steel all brackets shall be either stainless steel or aluminum

T.288.3 METHOD OF CONSTRUCTION

T.288.3.1

A. Contractor will remove the 4 existing incandescent Flashing Chevron signs and

wiring.

B. Install Control Cabinet and 4 LED Flashing Chevron signs 24”X30” with dimmer capabilities on to existing poles.

C. Wire Chevron signs back to Control Cabinet (wire paid by item #277 AWG 8).

The contract shall provide a power supply to take the system down from 240VAC to 120VAC in the central cabinet and then wire to each additional sign with a 12VDC junction box. Pull Box and conduit will be supplied by contractor.

Warranty

The Manufacturer shall offer a three-year unconditional warranty against all defects in material and workmanship.

END OF SECTION

SECTION T.289 LED 12 FLASHING CHEVRON SYSTEM

T.289.1 GENERAL

T.289.1.1 DESCRIPTION

Remove 16 electric flashing arrow, signal heads, mounting hardware, etc., from concrete barrier on Ramp B (see Contract Drawing # LT-41).
Install Control Cabinet and 12 LED Flashing Chevron signs 24" X 30", with dimmer capabilities on to new Pedestal poles (poles paid by item #290 & 291.

The SYSTEM shall include AC powered Assemblies of LED Flashing Chevron signs that run 24 hours a day. Components shall include:
LED Flashing Chevron Signs, Control Cabinets, Power Supplies, Flash Controllers, pole mounting hardware and any incidentals necessary to provide a working system .

This System shall consist of 12 warning indicators throughout the curve. Working 24/7 all indications associated with the system shall sequentially commence operation within 120 msec, and shall cease operation synchronously. The characteristics of the curve shall dictate the curve warning indicator flash pattern and timing that is programmed into each of the indicator controllers. Curve warning indicators shall operate in a sequential pattern both to enhance the curve warning signage and to guide road traffic through the curve.

T.289.1.2 SUBMITTALS

Product Data:
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

Certification:
Submit certification that the following products conform to the specified requirements:

24" x 30" LED flashing Chevron signs, control cabinet, Power Supply, Flash Controllers, mounting hardware .

T.289.1.3 QUALITY ASSURANCE

All work shall conform to the following:
Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting
Section 1102 - Sign Lighting

T.289.2 MATERIALS

T.288.2.1 Manufacturer shall have a minimum of ten years of relevant intelligent traffic product manufacturing experience, as well as a minimum of three years of BlinkerSign manufacturing experience.
Shall be TAPCO DCWS Solar Warning system or approved equal
TAPCO
5100 West Brown Deer Road
Brown Deer, WI 53223
12-LED Chevron Signs, W1-8, 24"x30", Chevron, DG3, FY, 12 VDC, 10 Amb LEDs with dimmer capabilities.
Sign Mounting Kit, Banded, Flared Leg, Anti-Vandal for mounting One Flashing Chevron Sign to a large pole.
Control Cabinet, 277-120 VAC, wiring to 12DVC boxes.

LED Flashing Chevrons:

All signs shall conform to 2009 Federal Highway Administration's MUTCD section 2A.07 on retro-reflectivity and illumination. Each Sign shall have Day-Viz® LEDs that are mounted individually into holes around the perimeter of the sign and shall be ultrasonically welded to the sign assembly to provide maximum strength and rigidity. Each sign blank material shall be a minimum of 0.080" thick aluminum. Each sign face shall consist of 3M™ Diamond Grade™ DG3 reflective sheeting applied to the sign blank with a 3M™ 1160 Premium Protective Overlay film to provide an additional layer of graffiti protection.
Each LED Flashing Chevron shall have ten quantity high power, 1 watt LEDs with a viewing angle of 15°. It shall be the size and color per the requirements and have the required MUTCD compliant W1-8 legend.
Size shall be 24" x30" which is specified in the plans
Have each LED sealed within a 7/8" diameter, heat-dissipating plastic enclosure to provide resistance to weather and vibration
Have the LEDs wired in strings to activate simultaneously per MUTCD standards.
Have the LEDs wired in parallel electrically so that remaining LEDs continue to flash in the event of the failure of an individual LED.
Wiring between LEDs shall be encapsulated inside 1" x 3/8" aluminum extrusions secured to the back of each sign assembly, to provide weather resistance and protection.
Each sign shall have two holes for mounting to a post or pole and vandal resistant fasteners to mount the LED sign assembly to a pole or post.

UV resistant label(s) shall be applied to the back of each sign assembly and shall include specific information such as the manufacturer, manufacturer phone number, model number, serial number, date of manufacture, and any applicable regulatory compliance information.

Control Cabinet:

The control cabinets shall be NEMA 3R Type. Each control cabinet houses the Flash Controller with Universal Switching Power Supply, fusing, and external component terminal block connections.

The Main Cabinet shall be 15" tall, 12.5" wide and 9.9" deep and constructed of minimum 0.080" thick aluminum. To promote airflow for internal components, the cabinet shall be vented with screening included on all vents and drains to prevent insects and other foreign matter from entering. For security, the cabinet must include at least two tamper-resistant stainless steel hinges and a replaceable #2 traffic lock with keys. To facilitate maintenance or repairs, the cabinet shall include a removable control panel to which all control circuit components either mount or connect.

To prevent corrosion, all materials used in the construction or mounting of the control cabinet shall be either aluminum or stainless steel. Anti-vandal mounting hardware shall be available as an option.

A UV resistant label shall be applied to the exterior of the cabinet and include system specific information including model number, serial number, date of manufacture, as well as any applicable regulatory compliance information.

Universal Switching Power Supply:

The Universal Switching Power Supply shall:

- Accept a universal AC input, 100-277VAC, 50/60 hz
- Output 12 VDC regulated to +/- 1%
- Have Short Circuit, Overload and Over Voltage protection

Pole Mounting Hardware:

- Shall be provided for mounting all system components to existing poles..
- All fasteners shall be stainless steel all brackets shall be either stainless steel or aluminum

T.289.3 METHOD OF CONSTRUCTION

T.289.3.1

Contractor will remove electric flashing arrow, signal heads, mounting hardware, wiring, etc., from concrete barrier on Ramp B (see Contract Drawing # LT-41).

Install Foundations(foundation paid by item # 290, conduit (conduit paid by item #272) and poles (poles paid by item # 291).

Install Control Cabinet and 12 LED Flashing Chevron signs 24”X30” with dimmer capabilities on to existing poles.

Wire Chevron signs back to Control Cabinet (wire paid by item #277 AWG 8).

The contract shall provide a power supply (If not provided by manufacturer) to take the system down from 240VAC to 120VAC in the central cabinet and then wire to each additional sign with a 12VDC junction box.

Warranty

The Manufacturer shall offer a three-year unconditional warranty against all defects in material and workmanship.

END OF SECTION

SECTION T.290 FOUNDATION (TYPE SPF)

T.290.1 GENERAL

T.290.1.1 DESCRIPTION

This work is the excavation, construction and backfilling of a concrete pedestal pole foundation with anchor bolts for pedestal poles as indicated on the NJDOT Standard Electrical Details T-1707- Foundation Type “SPF”, and as directed by the Engineer.

T.290.1.2 SUBMITTALS

At least ten (10) days prior to beginning work: submit shop drawings to the DRPA for approval, showing the dimensions and fabrication details for the Foundation Type SPF.

Certification:
Submit certification that the following products conform to the specified requirements:

Anchor Bolts

T.290.1.3 QUALITY ASSURANCE

CONFORM TO THE FOLLOWING:

Shall meet description and drawing as specified in NJDOT Standard Electrical Details T-1707- Foundation Type “SPF”

T.290.2 MATERIALS

T.290.2.1 Conform to requirements as specified in NJDOT Standard Electrical Details T-1707- Foundation Type “SPF”

T.290.3 METHOD OF CONSTRUCTION

T.290.3.1 Foundation Type “SPF”:

Form and construct of Class C cement, as specified in NJDOT Standard Electrical Details T-1707- Foundation Type “SPF”

(2) Mix, cure and test samples of the foundation concrete, in accordance with Authority procedures.

(3) Provide and place anchor bolts perpendicular to the top plane of the foundation, extending above the foundation. Use suitable templates or forms to hold the anchor bolts in position while placing concrete.

(4) Thoroughly clean the exposed portion of the anchor bolts and associated hardware.

(5) If necessary: Install individual electrical grounds for pole foundations. Where the resistance between pole and ground is greater than 25 ohms, install additional ground rods, as required.

(6) Backfill excavated spaces around the foundation with acceptable embankment material. Satisfactorily dispose of unsuitable and surplus materials.

END OF SECTION

SECTION T.291 PEDESTRIAN SIGNAL STANDARD, 10 FOOT

T.291.1 GENERAL

T.291.1.1 DESCRIPTION

This work is the furnishing and erection of aluminum 10 foot Pedestrian Signal Standard, 10 Foot as detailed in NJDOT Standard Electrical Details T-0707- Pedestrian Signal Standard. The pole shall be 10 Foot with cap.

T.291.1.4 SUBMITTALS

(1) Product Data. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

(2) Certification. Submit material, construction and manufacturer's certification that the following products conform to the specified requirements for load test.

T.291.1.5 QUALITY ASSURANCE

Shall meet description and drawing as shown in NJDOT Standard Electrical Details T-0707- Pedestrian Signal Standard, 10 Foot.

T.291.2 MATERIALS

T.291.2.1 Aluminum pole as shown in NJDOT Standard Electrical Details T-0707- Pedestrian Signal Standard, 10 Foot.

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T.291.3 METHOD OF CONSTRUCTION

Pedestal Poles and Accessories:
Install poles plumb. Use aluminum shims with aluminum bases; use stainless steel shims with other bases. Place shims under no more than three bolts of any base. Caulk with compound between the pole and the concrete foundation or leveling pad.

END OF SECTION

SECTION T.292 LED UNDERDECK COBRA HEAD LUMINAIRE

T.292.1 GENERAL

T.292.1.1 DESCRIPTION

At the Broad street location only (as shown on Contract Drawings):
Remove existing underdeck HPS Luminaires. Remove wiring back to roadway Junction Box- suppling power to Cobra head luminaire. Install new wiring and new Cobra Head Luminaires - Manufacturer: Cooper Lighting- Archeon LED Cobra Head Type Luminaire, Model #ARCH-M-AF48-120-D-U-T2-7030-10K-AP and new wiring.

T.292.1.2 SUBMITTALS

A. Product Data:
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification:
Submit material, construction and manufacturer's certification that the following products conform to the specified requirements for load test.

T.292.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.292.2 MATERIALS

T.292.2.1 Luminaires - Section 1101.06
Equip luminaires with integral multivolt ballasts.

Cooper Lighting Archeon LED luminaire Model #ARCH-M-AF48-120-D-U-T2-7030-10K-AP.

T.292.3 METHOD OF CONSTRUCTION

T.292.3.1 Remove existing underdeck HPS Luminaires. Remove wiring back to roadway Junction Box- suppling power to Cobra head luminaire. Install new wiring and new Cobra Head Luminaires - Manufacturer: Cooper Lighting- Archeon LED Cobra Head Type

Luminaire, Model #ARCH-M-AF48-120-D-U-T2-7030-10K-AP and new wiring. Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on end of arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

END OF SECTION

SECTION T.293 LED UNDERDECK WALL MOUNT LUMINAIRE

T.293.1 GENERAL

T.293.1.1 DESCRIPTION

This item includes the following:
Removal of existing underdeck luminaires, conduit and wiring.
Installation of Holophane LED Wallpack, Model # W4GLED 20C 1000 50K T3M MVOLT BZ (on abutment wall or concrete pier cap).
Installation of Cast junction Boxes (Junction Boxes paid for by item # 265).
Installation of new conduit and mounting hardware where need, and new wiring back to the roadway Junction box providing the electric to these underdeck luminaires..

This pay item includes luminaire, conduit, mounting hardware, wire from roadway feed junction box to luminaires, and any incidentals required to install a properly working circuit.

T.293.1.2 SUBMITTALS

A. Product Data:
Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.

B. Certification:
Submit material, construction and manufacturer's certification that the following products conform to the specified requirements for load test.

T.293.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting

T.293.2 MATERIALS

T.293.2.1 Luminaires:
PennDOT Specifications, Publication 408/2016-5, Section 1101.06
Equip luminaires with integral multivolt ballasts.

Conduit:
PennDOT Specifications, Publication 408/2016-5, Section 1101.09

Cable (wire):

PennDOT Specifications, Publication 408/2016-5, Section 1101.08

T.293.3 METHOD OF CONSTRUCTION

T.293.3.1

1. Remove existing underdeck Luminaires from between steel beams.
2. Run new conduit from existing Junction box to Abutment wall or Concrete pier cap.
3. Install Cast Junction Box (Junction Box paid for by item # 265) on to abutment wall or concrete pier cap.
4. Run new conduit from Cast Junction box to new LED Underdeck wall mounted luminaire.
5. Install new wire.
6. Provide drainage conduit at the low point of each conduit run.
7. Install expansion/deflection sleeves or couplings at each abutment and at each expansion joint of the bridge structures for each conduit.

Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on end of arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

END OF SECTION

SECTION T.294 JUNCTION BOX, JB-11, NEW LID

T.294.1 GENERAL

T.294.1.1 DESCRIPTION

This work shall consist of furnishing and installing a
Junction Box Lid type JB-11 as directed by the Engineer.
Also includes removal and disposal or delivery of existing Junction Box lid to DRPA storage yard as directed by the Engineer.

T.294.1.2 SUBMITTALS

At least ten (10) days prior to beginning work, submit shop drawings to the DRPA for approval, showing the dimensions and fabrication details for the junction box lid, Type JB-11

T.294.1.3 QUALITY ASSURANCE

Conform to the following:

A. Contract Drawings
B. PennDOT Standard Drawing RC-82M
C. PennDOT Specifications, Publication 408/2016-5
   a. Section 910 - Highway Lighting

T.294.2 MATERIALS

A. Provide a precast concrete junction box lid, Type JB-11 with Lifting pipe as specified in RC-82M.

B. All materials incorporated into the work shall meet the requirements of PennDOT Specifications, Publication 408/2016-5, Section 910.2.

T.294.3 METHOD OF CONSTRUCTION

Remove broken JB lid and install new lid.

Care shall be taken to correct JB frame as to provide correct installation and removal of new JB lid.

Also includes removal and disposal or delivery of existing Junction Box lid to DRPA storage yard as directed by the Engineer.

END OF SECTION

SECTION T.295 NOT USED

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SECTION T.296 SIGN LIGHTING 4 LED LUMINAIRES, STRUCTURE S-19

T.296.1 GENERAL

T.296.1.1 DESCRIPTION

This work is the electrification of lighted sign structure S-19 included in this project at location with Station as shown on the Contract drawings.

This item is limited to the equipment, luminaires, disconnect box, mounting hardware, conduit, Grounding hardware, wire and any incidentals required to energize luminaires on a sign structure. Power to the sign structure is covered under other pay items.

T.296.1.2 SUBMITTALS

Product Data:

Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for items listed below.

Luminaire, Disconnect box equipment, conduit, mounting hardware, Grounding hardware, wire, Misc. parts.

Certification: Submit certification that the following products conform to the specified requirements:

Luminaire, Disconnect box equipment, conduit, mounting hardware, Grounding hardware, wire, Misc. parts

T.296.1.3 QUALITY ASSURANCE

All work shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting
Section 1102 - Sign Lighting

T.296.2 MATERIALS

T.296.2.1 Materials

1. 4 Luminaires:
Holophane Sign-Vue LED II
Model # SVLED2 SVL PK3 MVOLT 50K PLM GYSDP IL
SVLEDF1FUS10 SVLED2-ISL-BKTPLT RFD267025.

2. Sign Structure Disconnect Cabinet: NEMA IV Enclosure, Lock and Keys, with 15 amp, 1 pole breaker and proper Grounding hardware, including ground rod.
3. Sign structure mounted rigid conduit & flex PVC coated steel conduit.
4. All wiring (AWG 10 TC cable) and mounting hardware necessary to properly install a 4 luminaire sign lighting system.

T.296.3 METHOD OF CONSTRUCTION

T.296.3.1 Coordinate with structure installation crew's schedule:

Furnish and install the necessary equipment such as Luminaires, conduit, conductors, circuit breakers, enclosures, Grounding hardware and any incidentals necessary, on or near sign structure to complete the electrical service from the junction box adjacent to the sign structure to the luminaires on the structure.

Luminaires.
Provide mounting brackets for luminaires on each sign at required spacing. Check the luminaires for the proper lamp socket position, in accordance with the lamp distribution indicated, before placing on the mounting arms. Uniformly adjust and level luminaires. Immediately prior to the illumination test, and after other work has been completed, clean light control surfaces, refractors, and reflectors, using an acceptable cleaner, to provide the maximum light output. Clean, in accordance with the luminaire manufacturer's recommendations.

END OF SECTION

SECTION T.297 UNFORESEEN WWB INFRASTRUCTURE REPAIR

T.297.1 GENERAL

T.297.1.1 DESCRIPTION

This work shall consist of constructing, furnishing and/or installing material/equipment to correct any unforeseen existing broken material/equipment or problems which arise during construction, that would holdup further progress. This item could also be used to correct an existing problem that could lead to harm of newly install material/equipment.

This item shall only be used when directed by the Engineer.

T.297.1.2 SUBMITTALS

A. As required by the Engineer.

T.297.1.3 QUALITY ASSURANCE

All work shall conform to the following:
Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:
Sections 910 and 1101 - Highway Lighting
Section 1102 - Sign Lighting

T.297.2 MATERIALS

T.297.2.1 All material shall conform to the following:

Referenced Standards:

PennDOT Specifications, Publication 408/2016-5:

T.297.3 METHOD OF CONSTRUCTION

A. As directed by the Engineer.

END OF SECTION

SECTION T.298-312 NOT USED

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T.313 SCARIFICATION, 1 ¾" DEPTH

T.313.1 GENERAL

T.313.1.1 DESCRIPTION: This work is scarifying existing concrete or latex modified concrete topped bridge decks to a uniform 1 ¾" depth in preparation for hydrodemolition and placement of a latex modified concrete wearing surface. This work applies to the following bridges: Randolph Street Overpass, Seventh Street Overpass, Tenth Street Overpass, Broad Street Overpass, and Ramp K-L.

T.313.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION
D. T.316 – LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH

T313.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.313.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

T.313.2 MATERIALS – Not Used

T.313.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1041.3 and as modified as follows:

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Prior to scarification, perform field survey of existing top of deck in order to properly install new latex modified concrete overlay to match existing deck elevations, grades and cross slopes.

END OF SECTION

T.314 SCARIFICATION, 1" DEPTH

T.314.1 GENERAL

T.314.1.1 DESCRIPTION: This work is scarifying existing concrete bridge decks and approach slabs, as indicated, to a uniform 1" depth in preparation for hydrodemolition and placement of a latex modified concrete wearing surface. This work applies to the following bridges: Ramp M, Eastbound over Moyamensing Avenue, Westbound over Moyamensing Avenue, Eastbound over Passyunk Avenue and Westbound over Passyunk Avenue.

Scarification of exposed concrete approach slabs is applicable to the following bridges: Ramp M, Eastbound over Moyamensing Avenue, Eastbound over Passyunk Avenue, and Westbound over Passyunk Avenue.

T.314.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION
D. T.317 – LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH

T.314.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.314.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

T.314.2 MATERIALS – Not Used

T.314.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1041.3 and as modified as follows:

Perform work in accordance with traffic staging indicated in Traffic Control Plans.

Prior to scarification, perform field survey of existing top of deck, and approach slabs, where applicable, in order to properly install new latex modified concrete overlay to match existing deck/approach slab elevations, grades, and cross slopes.

END OF SECTION

T.315 CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION

T.315.1 GENERAL

T.315.1.1 DESCRIPTION: This work is bridge deck and approach slab (where applicable) preparation using hydrodemolition to remove ¼" depth of sound concrete, further roughen scarified concrete, and to remove all unsound material. This item also includes the removal and disposal of all concrete and debris, vacuuming, shielding, water control, additional jack hammering, and all other aspects of work necessary to prepare the deck for the placement of the new latex modified concrete overlay.

Hydrodemolition of exposed concrete approach slabs is applicable to the following bridges: Ramp M, Eastbound over Moyamensing Avenue, Eastbound over Passyunk Avenue, and Westbound over Passyunk Avenue.

T.315.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.313 – SCARIFICATION, 1 ¾" DEPTH
D. T.314 – SCARIFICATION, 1" DEPTH

T.315.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.315.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

T.315.2 MATERIALS – Not Used

T.315.3 CONSTRUCTION

Perform hydrodemolition surface preparation over the entire top surface of the bridge deck and approach slabs, where applicable, to remove the final ¼" of concrete thickness, to remove all unsound concrete and to provide a rough and bondable surface. Remove any unsound concrete or original deck surface found after the initial hydrodemolition surface preparation pass at no additional cost to the Authority.

Unsound concrete is defined as existing bridge deck concrete that is deteriorated, spalled, or determined by the Engineer to be unsound.

All exposed reinforcement bars shall be cleaned free of all rust, contaminants, and pockets of corrosion. Rust remaining after initial hydrodemolition may be cleaned by high pressure water blasting (minimum 10,000 psi), water blasting (less than 10,000 psi) with abrasives in water, abrasive blasting with containment, or vacuum abrasive blasting.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

The requirement to provide a minimum 3/4" clearance around all reinforcement bars that are more than 1/2 diameter exposed is waived, providing that the existing concrete is sound. The amount of steel exposed should be kept to a minimum.

Where more than ½ diameter of the reinforcement bar is exposed and the bar is corroded around the circumference or the adjacent concrete is rust stained, or the bar is de-bonded from the substrate concrete, chip away concrete or hydroblast to provide a minimum ¾" clearance or as directed by the Engineer.

All construction debris, scarification/milling debris, and dust are to be completely removed from the bridge deck surface prior to calibration and commencement of the hydrodemolition surface preparation operation.

Provide a non-working technical field representative on the project site during the calibration and the hydrodemolition surface preparation operation.

Prior to the commencement of the hydrodemolition surface preparation operation, calibrate the hydrodemolition equipment on an area of sound concrete (7' x 7') as designated by the Engineer to demonstrate the desired result of this specification.

Move the hydrodemolition equipment to a second area (7' x 7') that is unsound as designated by the Engineer to demonstrate the desired result of

this specification which is providing a highly rough and bondable surface and removing all unsound concrete during a single pass.

If the equipment or end result is deemed unsatisfactory by the Engineer, remove the hydrodemolition equipment from the project site and provide another hydrodemolition unit for calibration at no additional cost to the Authority. No additional contract time will be provided for this recalibration process if required.

Provide verification of the following settings to the Engineer:

- Water Pressure Gauge;
- Sufficient water usage to remove all deteriorated and unsound concrete/material;
- Machine staging control (step);
- Nozzle size; and
- Nozzle speed (travel)

The hydrodemolition surface preparation production may begin after the Engineer has approved the second calibration and the above settings. Maintain and give to the Engineer the calibration and production settings prior to and during hydrodemolition surface preparation.

Stop the surface preparation operation if it is determined that excessive sound concrete is being removed or unsatisfactory results are being obtained, as determined by the Engineer. Perform appropriate recalibration or changes in equipment and methods prior to resuming the operation.

The calibration procedure specified is required each time hydrodemolition surface preparation is performed and as required to achieve the results specified.

Submit a plan for approval to the Engineer for control and filtering of all water discharged during operation. Provide necessary settlement basins or devices to permit only visibly clear water from leaving the project site. Protect all scuppers, inlets, and downspouts from any material that would cause plugging. Provide free flowing, unobstructed drainage structures at the completion of this operation.

Provide shielding, as required, to ensure containment of all dislodged concrete within the removal area in order to protect the traveling public from flying debris on, adjacent to, and below the work site. Shielding is incidental to this item of work.

After the hydrodemolition surface preparation operation has completed the initial pass, and the deck is dry and frost free, resound the deck to ensure that all unsound material has been removed. Remove unsound materials as directed by the Engineer by pneumatic hammers (not heavier than 30 pound class) or by hydrodemolition at no additional cost to the Authority. Removal of any existing unsound patching material or existing unsound overlay material that is not removed during the initial hydrodemolition surface preparation pass is incidental to this item of work.

Clean the hydrodemolition and scarification debris with a vacuum system equipped with fugitive dust control devices and capable of removing wet debris and water all in the same pass. Blow-dry the deck with air to remove excess water. Perform cleaning in a timely manner, before debris and water is allowed to dry on the deck surface. Remove any material allowed to dry prior to sounding at no additional cost to the Authority. Splice or replace any reinforcement bars damaged or dislodged by these operations, with the same size bar, at no additional cost to the Authority.

The hydrodemolition equipment is required to be a computerized, self-propelled machine that utilizes a high pressure water jet stream to provide a rough and bondable surface while removing all unsound concrete and rust and concrete particles from exposed reinforcement bars.

Power driven hand tools for removal of deteriorated concrete are required to be used in areas that are inaccessible to the hydrodemolition equipment or in patching areas that require minor trim work to remove the remaining unsound concrete and are subject to the following restrictions:

- Do not use pneumatic hammers with more weight than nominal 30-pound class.
- Do not operate pneumatic hammers or mechanical chipping tools at an angle in excess of 45 degrees relative to the surface of slab.
- Do not place pneumatic tools in direct contact with reinforcement bars.
- Triple-headed tampers fitted with star drills not less than 2 inches in diameter in the tamper sockets may be used in the vertical position.

Use hand tools such as hammers and chisels, or small air chisels to remove final particles of unsound concrete or to provide necessary clearances around reinforcement bars.

END OF SECTION

T.316 LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH

T.316.1 GENERAL

T.316.1.1 DESCRIPTION: This work is construction of a one course wearing surface of latex modified concrete on existing bridge decks to the depth indicated. This work applies to the following bridges: Randolph Street Overpass, Seventh Street Overpass, Tenth Street Overpass, Broad Street Overpass, and Ramp K-L.

T.316.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DUIRNG CONSTRUCTION
C. T.315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION

T.316.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".

T.316.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit to the Engineer for review a plan and procedure for placement of the latex modified concrete at least two weeks prior to the latex modified concrete placement operations.

T.316.2 MATERIALS - In accordance with PennDOT Publication 408/2016, Section 1042.2.

T.316.3 **CONSTRUCTION** - In accordance with PennDOT Publication 408/2016, Section 1042.3 and as follows:

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

END OF SECTION

T.317 LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH

T.317.1 GENERAL

T.317.1.1 DESCRIPTION: This work is construction of a one course wearing surface of latex modified concrete on existing bridge decks and approach slabs, as indicated, to the depth indicated. This work applies to the following bridges: Ramp M, Eastbound over Moyamensing Avenue, Westbound over Moyamensing Avenue, Eastbound over Passyunk Avenue and Westbound over Passyunk Avenue.

Placement of latex modified concrete on exposed concrete approach slabs is applicable to the following bridges: Ramp M, Eastbound over Moyamensing Avenue, Eastbound over Passyunk Avenue, and Westbound over Passyunk Avenue.

T.317.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION

T.317.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or it's "Designee".

T.317.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit to the Engineer for review a plan and procedure for placement of the latex modified concrete at least two weeks prior to the latex modified concrete placement operations.

T.317.2 **MATERIALS** - In accordance with PennDOT Publication 408/2016, Section 1042.2.

T.317.3 **CONSTRUCTION** - In accordance with PennDOT Publication 408/2016, Section 1042.3 and as follows:

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

END OF SECTION

T.318 LATEX MODIFIED CONCRETE WEARING SURFACE, VARIABLE ADDITIONAL DEPTH

T.318.1 GENERAL

T.318.1.1 DESCRIPTION: This item is the material costs only for furnishing additional latex modified concrete to the job site, in place. This item is the material cost of only the additional, variable depth latex modified concrete beyond the plan specified depth required due to areas removed by scarification and hydrodemolition that are greater than the plan specified total removal depth.

This work applies to the following bridges: Randolph Street Overpass, Seventh Street Overpass, Tenth Street Overpass, Broad Street Overpass, Ramp K-L, Ramp M, Eastbound over Moyamensing Avenue, Westbound over Moyamensing Avenue, Eastbound over Passyunk Avenue, and Westbound over Passyunk Avenue.

T.318.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION
D. T.316 – LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH
E. T.317 – LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH

T.318.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.318.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

T.318.2 **MATERIALS –** In accordance with PennDOT Publication 408/2016, Section 1042.2.

T.318.3 **CONSTRUCTION -** In accordance with PennDOT Publication 408/2016, Section 1042.3 and as follows:

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

END OF SECTION

T.319 APPLICATION OF PENETRATING SEALER TO REINFORCED CONCRETE SUPERSTRUCTURE SURFACES

T.319.1 GENERAL

T.319.1.1 DESCRIPTION: This work is cleaning and applying a penetrating sealer to bridge median and edge barriers, barriers at soundwalls, soundwall anchor beams, and bedding material between soundwall barriers and anchor beams, as indicated or directed.

T.319.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
D. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
E. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
F. T.325 – EPOXY INJECTION CRACK REPAIR
G. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.319.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.319.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.319.2 MATERIALS

A. Penetrating Sealers – Furnish a one-component penetrating sealer material as defined in PennDOT Publication 408/2016, Section 1019.2(d), from a manufacturer listed in PennDOT Publication 35 (Bulletin 15).

Certify as specified in PennDOT Publication 408/2016, Section 106.03(b)3.

T.319.3 CONSTRUCTION

T.319.3.1 GENERAL

Perform work in accordance with the traffic staging shown in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

T.319.3.2 SURFACE PREPARATION AND APPLICATION

Apply penetrating sealer in accordance with PennDOT Publication 408/2016, Section 1019.3(c), and the manufacturer's recommendations.

END OF SECTION

T.320 APPLICATION OF PENETRATING SEALER TO REINFORCED CONCRETE SUBSTRUCTURE SURFACES

T.320.1 GENERAL

T.320.1.1 DESCRIPTION: This work is cleaning and applying a penetrating sealer to substructure concrete surfaces, including, but not limited to, abutment backwalls, beam seats and pier cap top surfaces, as indicated or directed.

T.320.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
D. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
E. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
F. T.325 – EPOXY INJECTION CRACK REPAIR
G. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.320.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.320.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.320.2 MATERIALS

A. Penetrating Sealer – Furnish a penetrating sealer as defined by PennDOT Publication 408/2016, Section 1019.2(c) from a manufacturer listed in PennDOT Publication 35 (Bulletin 15).

Certify as specified in PennDOT Publication 408, Section 106.03(b).3.

T.320.3 CONSTRUCTION

T.320.3.1 GENERAL

Perform work in accordance with the traffic staging shown in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

T.320.3.2 SURFACE PREPARATION

Surface preparation shall be in accordance with PennDOT Publication 408, Section 1019.3(c)1.a, and the manufacturer's recommendations.

T.320.3.3 APPLICATION

Apply penetrating sealer in accordance with the PennDOT Publication 408, Section 1019.3(c)1.b, the manufacturer's recommendations, and as modified as follows:

Do not apply penetrating sealer until all concrete repair work has been completed. Allow concrete repair areas to cure a minimum of 14 days before applying sealer.

Do not apply sealer until the proposed bearing rehabilitation work has been completed.

END OF SECTION

T.321 APPLICATION OF ANTI-GRAFFITI COATING

T.321.1 GENERAL

T.321.1.1 DESCRIPTION: This work is the application of anti-graffiti coating to existing concrete and coated concrete surfaces, as indicated or directed.

T.321.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
D. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
E. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
F. T.325 – EPOXY INJECTION CRACK REPAIR
G. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS
H. T.399 – CSX COORDINATION

T.321.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.321.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.
D. Submit a color sample to the Engineer for approval prior to purchasing and coating application.

T.321.2 MATERIALS

A. ANTI-GRAFFITI COATING

G2G VGF-316 Solvent-Free Silicone Coating
Manufacturer: G2G Silicones

Or Approved Equal

Portions of several structures to be coated contain existing coatings including, but not limited to painted concrete (epoxy or other). The anti-graffiti coating to be used must be suitable for application over the various existing coatings with in-scope surface preparation.

B. Color – Apply anti-graffiti coating (Color: Gray) to areas designated to be coated on the CSX Overpass. Apply anti-graffiti coating (Color: White) to areas designated to be coated on all other structures.

T.321.3 CONSTRUCTION

T.321.3.1 GENERAL

Perform work in accordance with the traffic staging shown in the Traffic Control Plans.

Perform work at CSX Railroad Overpass in accordance with Item 399 – CSX COORDINATION. Conduct operations so as not to interfere with, interrupt, or endanger the operation of trains or damage, destroy, or endanger the integrity of railroad facilities.

Provide work platforms and protection shields, as required.

T.321.3.2 SURFACE PREPARATION

Prepare surfaces in accordance with manufacturer's recommendations.

Seal any cracks or abnormalities in the existing surfaces to be coated, as required, and not otherwise designated for repair, by application of a manufacturer recommended sealer. Apply sealer per manufacturer's recommendations.

Cure concrete materials to be coated for a minimum of 28 days prior to coating. Clean surfaces to be coated of all residual dirt, grease, curing agents, retarding chemicals, form release agents, and all other contaminants by use of a high pressure hose, having a minimum pressure of 2000 psi at the nozzle, along with hot water and a suitable chemical solvent. Rinse cleaning chemicals thoroughly from surfaces to be coated.

Areas of algae, mildew or fungus on the surface, or the coating not removed by the previous methods, should be treated with a chlorine water solution, followed by a clear water rinse. (This treatment can be done using a commercially available chlorine compound available from swimming pool supply houses. Concentration of the chlorine solution should be five times that recommended for normal treatment of swimming pool.)

A. Remove any graffiti which has been applied, either prior to or during the coating application process, in accordance with the coating manufacturer's recommendations and in a manner which retains the current color, texture, and integrity of both the structure being coated and the coating.

B. Drying: Surface must be completely dry before applying products. Drying depends on weather conditions such as temperature, humidity and air movement. Conditions of lower temperature and rain will require a longer period for drying.

T.321.3.3 INSTALLATION

Apply in accordance with the manufacturer’s recommendations, and to manufacturer’s recommended thickness. Care must be taken to ensure proper film thickness. Surface must be dry, clean and free of debris. Extra material may be required on some wall surfaces because of the surface profile.

Pollution Controls. Prevent environmental pollution including stream and air pollution caused by paint, paint sprays, dust, or other harmful materials.

Do not apply coating until all concrete repair work has been completed within the area to be coated.

Have the manufacturer of the anti-graffiti coating material provide a technical representative to oversee the start of the coating operations. The representative shall be present for a minimum of one complete application cycle, including, but not limited to, surface preparation, coating application and curing.

All coatings must be thoroughly mixed/agitated with a drill mixer prior to application. Contact manufacturer for equipment and tool recommendations for application.

Coating may be spray applied or roller applied. Mask or otherwise protect all areas and property that are not to be coated, to ensure that they remain free of coating overspray. Apply the coating around and without obstructing, either permanently or temporarily, any existing lights, signs, signals, and other appurtenances attached to the elements to be coated.

Apply coating to thoroughly dry surfaces free of all moisture, dew, or condensate. Do not apply coating in rain, snow, fog, or mist. Do not apply coating when rain or precipitation is expected within 6 hours of application. Do not apply coating when air temperature is expected to fall below 33F at any time during the day or when the relative humidity is above 88%.

All equipment used during operations shall be located so as not to adversely affect the daily operations or endanger occupants, structure or materials on-site. All spray equipment must be grounded during operations.

A final inspection will be made by the Engineer along with a representative of the coating manufacturer and the Contractor. Correct all defects or deficiencies in the coating and remove any graffiti prior to final acceptance.

END OF SECTION

T.322 – T.324 REINFORCED CONCRETE REPAIR – TYPES 1, 2 & 3

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 322 REINFORCED CONCRETE REPAIR – TYPE 1
ITEM 323 REINFORCED CONCRETE REPAIR – TYPE 2
ITEM 324 REINFORCED CONCRETE REPAIR – TYPE 3

T.322.1 GENERAL

T.322.1.1 DESCRIPTION

The provisions of this section are applicable to the inspection, mark-out and repair of concrete spalls and delaminations on bridge substructures, pedestrian underpasses, bridge and bridge approach slab barriers, roadway barriers within the limits of the CSX Railroad Overpass, soundwall barriers, and soundwall anchor beams. The locations and limits of the concrete repair will be marked out by the Contractor and verified by the Engineer. This item includes all labor, materials and equipment necessary to perform the concrete repairs as specified herein and as shown in the contract drawings.

Reinforced Concrete Repair – Type 1 consists of repairing shallow spalls with no exposed reinforcement.

Reinforced Concrete Repair – Type 2 consists of repairing deep spalls with exposed reinforcement.

Reinforced Concrete Repair – Type 3 consists of cleaning and sealing spalls with shallow reinforcement and insufficient concrete cover.

T.322.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.319 – APPLICATION OF PENETRATING SEALER TO BRIDGE CONCRETE SUPERSTRUCTURE SURFACES
D. T.320 – APPLICATION OF PENETRATING SEALER TO BRIDGE CONCRETE SUBSTRUCTURE SURFACES
E. T.325 – EPOXY INJECTION CRACK REPAIR
F. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.322.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.322.2 MATERIALS

A. Rapid set concrete patching material satisfying requirements of PennDOT Publication 408/2016, Section 679.2 (e)
B. Epoxy bonding compound, Type II, Grade 3 satisfying requirements of PennDOT Publication 408/2016, Section 706.1
C. Epoxy coated deformed reinforcement bars satisfying requirements of PennDOT Publication 408/2016, Section 709.1
D. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.
E. Concrete sealer shall be: Sika Ferrogard 903 or Approved Equal.
F. Epoxy coated welded wire fabric satisfying requirements of PennDOT Publication 408/2016, Section 709.3.

T.322.3 CONSTRUCTION

T.322.3.1 INSPECTION AND MARK OUT

The Contractor shall mark out areas of delamination, spalls and reinforcement with insufficient cover.

The limits of spall repair shall be verified, measured and approved by the Engineer prior to the Contractor starting repair work.

The Contractor shall provide the equipment and labor for the Authority's representatives to access the mark-out areas.

T.322.3.2. SURFACE PREPARATION AND REPAIR WORK

A. Repairs Type 1 and 2:

1. Remove all delaminated or deteriorated concrete. For Type 2

repair, remove the deteriorated concrete to a minimum depth of 1" inch behind the existing reinforcement steel.

2. Saw cut to a depth of ¾" around the area of deteriorated/delaminated concrete to be removed.

3. All loose and disintegrated concrete shall be removed from the areas to be repaired in such a manner and to such an extent as to expose a sound concrete surface. Sound concrete (beneath the disintegrated concrete) shall be removed for a depth of not less than ¼ inch and not more than 1 inch, and the remainder of the area shall be cleaned and roughened by sandblasting. The work shall be done in such a manner as not to damage the concrete that is to remain.

4. Removal of concrete or preparing and shaping areas to be repaired may be performed by power chipping or hand tools, except that pneumatic hammers heavier than nominal 30-pound class (33 pounds maximum) will not be permitted. Pneumatic hammers and chipping tools shall not be operated at an angle exceeding 45 degrees relative to the surface. Technical data sheets for pneumatic hammers intended for use shall be submitted for approval.

5. Hand chipping methods shall be used to remove concrete adjacent to exposed reinforcing steel. Care shall be taken so as not to damage or de-bond the reinforcement steel, or to shatter the concrete beyond the area to be repaired.

6. All corroded reinforcing bars shall be cleaned by sandblasting, water blasting, or wire brushing. Those bars that have lost 25 percent or more of their original cross-sectional area shall be supplemented by splicing in new epoxy-coated reinforcement steel of the same diameter. Wire mesh may be substituted for new reinforcing. In supplementing existing bars, they shall be lapped at least 30 bar diameters and wired together. If necessary, additional chipping of concrete shall be done to provide for this lap. Where reinforcement is broken or missing, new bars shall be lapped at least 30 bar diameters on each side of the break. When least surface dimension of deteriorated concrete is greater than 2'-0" and new or existing reinforcement cannot be adequately developed by lapping with existing reinforcement, dowels can be used. Use a pachometer to locate existing reinforcement when drilling dowel holes to avoid drilling thru existing bars.

7. All existing reinforcement bars to be retained shall be straightened and coated with an epoxy reinforcement bar patching material.

8. Coat roughened concrete surfaces with epoxy bonding compound immediately prior to concrete placement.

9. Finish concrete to match existing.

10. All operations shall conform to the manufacturer's recommendations for placing quick-setting patch materials. Copies of the manufacturer's technical data sheets shall be submitted for review and approval. A technical representative of the manufacturer shall be present on the site at the start of patching work to provide guidance in the preparation and placement of the quick-setting patch material based on prevailing climatic and job conditions. The representative shall be present at least during one complete cycle of the procedures required for the initial placement.

11. When using a quick setting patch material, the patched area shall be wet cured by covering with wet burlap immediately after complete placement and finishing of the material. The patched area shall be kept covered for a period of twenty four (24) hours.

B. Repairs Type 3:

1. Surface must be clean, sound and free of surface contaminants. Remove rust, dust, grease, oils and foreign particles by mechanical means.

2. Prepare and apply two coats of the concrete sealer product in accordance with the manufacturer's recommendations and specifications. The sealant must completely cover the exposed reinforcement and seal it from the elements. Clean excess material around proposed sealing areas as per manufacturer's recommendations.

END OF SECTION

T.325 EPOXY INJECTION CRACK REPAIR

T.325.1 GENERAL

T.325.1.1 DESCRIPTION: The provisions of this section are applicable to the preparation and repair (sealing) of cracks with epoxy resin mixture. This section covers the sealing of small to medium (up to 1/2" wide) cracks only.

T.325.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
D. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
E. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
F. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.325.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.325.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.325.2 **MATERIALS –** In accordance with PennDOT Publication 408/2016, Section 1091.2.

T.325.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1091.3 and as follows:

The Contractor shall mark out limits of epoxy injection crack repair.

The limits of epoxy injection crack repair shall be verified, measured and approved by the Engineer prior to the Contractor starting repair work.

The Contractor shall provide the equipment and labor for the Authority's representatives to access the mark-out areas.

Perform work in accordance with the traffic staging shown in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.326 REPLACE NEOPRENE STRIP SEAL GLAND

T.326.1 GENERAL

T.326.1.1 DESCRIPTION: This work is the removal of the existing neoprene strip seal gland, furnishing and installation of a new neoprene strip seal gland of the movement classification indicated, reusing the existing steel extrusions. Work includes the removal and reinstallation of existing barrier steel sliding plates, as indicated. This work applies to the following bridges: Seventh Street Overpass, Tenth Street Overpass, Eastbound over Moyamensing Avenue and Westbound over Passyunk Avenue.

T.326.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.326.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PennDOT Standard Drawing BC-767M

T.326.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.326.2 MATERIALS –

A. Neoprene Strip Seal and Lubricant Adhesive – PennDOT Publication 408/2016, Section 705.4(d), from a manufacturer listed in PennDOT Publication 35 (Bulletin 15).

T.326.3 CONSTRUCTION – In accordance with PennDOT Standard Drawing BC-767M, and as follows:

Before ordering neoprene strip seal material, field verify the size, shape and configuration of the gland required to fit the existing armor.

It is the Contractor's responsibility to identify and match the specific existing strip seal gland by removing a sample of the existing strip seal gland. When removing a sample, cut the sample from the end of the gland.

Remove the existing neoprene strip seal, and blast metal surfaces in direct contact with the neoprene strip seal to remove foreign material and to provide for proper bond between the neoprene strip seal and the metal surfaces. Clean as specified in PennDOT Publication 408/2016, Section 1071.3(c)1.

Do not cause damage beyond the limits of removal. Repair any damage beyond limits of removal to the satisfaction of the Engineer at no additional cost to the Authority.

Neoprene strip seals shall be continuous over the full width of the superstructure. Do not splice the neoprene strip seal.

If stretching of the seal during installation is unavoidable, do not exceed 5% elongation.

The Authority will not accept cocked or twisted seal installation.

Remove and replace neoprene strip seals that are damaged during installation at no additional cost to the Authority.

Remove and reinstall the existing barrier steel sliding plates to permit installation of the neoprene strip seal.

Protect the new neoprene strip seal gland from damage during scarification, hydrodemolition, and all other construction activities. Repair any damage to the satisfaction of the Engineer at no cost to the Authority.

Flood gland with water after installation and inspect for leaks or damage. Repair leaks or damage to the satisfaction of the Engineer at no cost to the Authority.

Properly dispose of all material to the satisfaction of the Engineer.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

Coordinate expansion dam replacement work with superstructure repair work in the vicinity of the expansion dams, including, but not limited to, superstructure jacking and bearing resetting.

END OF SECTION

T.327 REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS

T.327.1 GENERAL

T.327.1.1 DESCRIPTION: This work is the removal of the existing neoprene strip seal gland, furnishing and installation of a new neoprene strip seal gland, along the full out-to-out of the structure, of the movement classification indicated, reusing the existing steel extrusions. This work includes removal of portions of existing concrete median glare screen barrier, and the furnishing of materials, services, labor, tools, equipment and incidentals necessary to fabricate and install the new neoprene strip seal gland and reconstruct median glare screen with new steel sliding plates. Work also includes the removal and reinstallation of existing barrier steel sliding plates at edge barriers, as indicated. This work also includes the disposal of removed portions of median glare screen and neoprene strip seal gland. This work applies to the Randolph Street Overpass.

T.327.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.327.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PennDOT Standard Drawing BC-767M

T.327.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

B. Prior to fabrication of the steel sliding plates, submit shop drawings to the Engineer for review and approval. Submit shop drawings, as specified in PennDOT Publication 408/2016, Section 105.02(d), showing complete details, dimensions, sizes, and concrete screw/insert locations as well as other information and data necessary for the complete fabrication and erection of the steel sliding plates.

C. Submit a plan to the Engineer showing and describing the demolition and removal methods to be used for removal of portions of the existing bridge, as indicated. Do not proceed with this demolition work until the plan has been reviewed and accepted.

T.327.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Sections 1026.2 and 705, PennDOT Standard Drawing BC-767M, and as follows:

A. Neoprene Strip Seal and Lubricant Adhesive – PennDOT Publication 408/2016, Section 705.4(d), from a manufacturer listed in PennDOT Publication 35 (Bulletin 15).
B. Class AA Cement Concrete – PennDOT Publication 408/2016, Section 704 for median glare screen within blockout.
C. Epoxy bonding Compound – PennDOT Publication 408/2016, Section 1001.2(k).
D. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.
E. Barrier Sliding Plates – PennDOT Publication 408/2016, Section 1105.02(a)2, Grade 36, shop painted in accordance with PennDOT Publication 408/2016, Section 1060.
F. Reinforcement Bars – ASTM A615, Grade 60, in accordance with PennDOT Publication 408/2016, Section 1002.2.
G. Paint
    a. New Steel Surfaces – See PennDOT Publication 408/2016, Section 1060.
    b. Paint color: Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

T.327.3 CONSTRUCTION – In accordance with PennDOT Standard Drawing BC-767M, and as follows:

T.327.3.1 DEMOLITION:

Remove portions of existing median glare screen, including steel sliding plates, within median glare screen blockout and removal limits, as indicated

in the plans, in accordance with Publication 408/2016, Section 1018.3 and this specification.

Limit pneumatic hammers or mechanical chipping tools used for removal of median glare screen concrete to 30 ft-lb rated impact. Saw cut a neat line prior to impact tool removal of existing concrete.

Do not operate pneumatic hammers or mechanical chipping tools at an angle in excess of 45 degrees relative to the surface of existing concrete.

Do not place pneumatic tools in direct contact with reinforcing steel that is to remain.

Use hand tools such as hammers and chisels, or small air chisels to remove final particles of unsound concrete around reinforcement bars.

Do not cause damage beyond the limits of removal. Repair any damage beyond limits of removal to the satisfaction of the Engineer at no additional cost to the Authority.

Coordinate expansion dam gland replacement work with superstructure repair work in the vicinity of expansion dams, including, but not limited to superstructure jacking and bearing resetting.

T.327.3.2 FABRICATION:

Verify all dimensions in the field prior to fabrication for proper fit.

Fabricate steel sliding plates according to the shop drawings and as appropriate to match existing barrier dimensions, profiles and grades.

T.327.3.3 INSTALLATION:

Construct in accordance with PennDOT Publication 408/2016, Section 1026.3, applicable portions of Sections 1001 and 1040 and sections referenced therein, PennDOT Standard Drawing BC-767M, manufacturer's recommendations, as indicated and as follows:

Sandblast or waterblast concrete within median glare screen blockout removal limits to remove partially loosened chips of concrete. Sandblast, waterblast, or wire brush exposed reinforcement bars to remove rust and corrosion. Remove all portions of damaged or heavily corroded reinforcement bars, and replace with the same type of bars, as specified in Section 1002.3 and as directed. Replacement of corroded reinforcement is incidental to this item of work. Blow all removal areas clean with oil-free

compressed air and protect them against any contaminate detrimental to the bond of the new concrete.

Before placing median glare screen blockout concrete, clean and prepare exposed surfaces of existing concrete with an approved concrete bonding compound, place new median glare screen concrete incorporating the existing reinforcement into the blockout pours.

Do not damage any of the existing reinforcement which is to remain. Mechanically clean any exposed reinforcement which is to remain to remove heavy rust, scale and loose concrete chips.

Mechanically clean and coat with epoxy reinforcing bar patching material any exposed reinforcing steel which is to remain. Cleaning and coating of exposed reinforcing steel is incidental to this item of work. Repair or replace any median glare screen reinforcement damaged during barrier concrete removal operations at no cost to the Authority.

Before ordering neoprene strip seal material, field verify the size, shape and configuration of the gland required to fit the existing armor.

It is the Contractor's responsibility to identify and match the specific existing strip seal gland by removing a sample of the existing strip seal gland. When removing a sample, cut the sample from the end of the gland.

Remove the existing neoprene strip seal, and blast metal surfaces in direct contact with the neoprene strip seal to remove foreign material and to provide for proper bond between the neoprene strip seal and the metal surfaces. Clean as specified in PennDOT Publication 408/2016, Section 1071.3(c)1.

Neoprene strip seals shall be continuous over the full width of the roadway between edge barriers. Do not splice the neoprene strip seal.

If stretching of the seal during installation is unavoidable, do not exceed 5% elongation.

The Authority will not accept cocked or twisted seal installation.

Remove and replace neoprene strip seals that are damaged during installation at no additional cost to the Authority.

Removal and reinstallation of existing edge barrier steel sliding plates is required to permit installation of the neoprene strip seal.

Protect the new neoprene strip seal glands at expansion joints from damage

during scarification, hydrodemolition, and all other construction activities. Repair any damage to the satisfaction of the Engineer at no cost to the Authority.

Install the barrier sliding plates in accordance with PennDOT Publication 408/2016, Section 1050.3 and as indicated on the drawings.

Flood gland with water after installation and inspect for leaks or damage. Repair leaks or damage to the satisfaction of the Engineer at no cost to the Authority.

Properly dispose of all material to the satisfaction of the Engineer.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.328 REPLACE NEOPRENE STRIP SEAL EXPANSION DAM

T.328.1 GENERAL

T.328.1.1 DESCRIPTION: This work is the removal of existing and furnishing and installation of new neoprene strip seal expansion dams for bridge joints of the indicated movement classification. This work includes removal of the existing expansion dams, including portions of the existing concrete deck, abutment backwall, and barriers, and the furnishing of materials, services, labor, tools, equipment and incidentals necessary to fabricate and install the new expansion dams and reconstruct concrete deck, abutment backwall, and barriers with new steel sliding plates. This work also includes disposal of removed portions of deck, backwall, barrier and expansion dam elements. This work applies to the following bridges: Broad Street Overpass, Ramp M, and Eastbound over Passyunk Avenue.

T.328.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
D. T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT
E. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.328.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    3. PennDOT Publication 15, latest edition. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    4. PennDOT Standard Drawing BC-767M

T.328.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Prior to fabrication of the expansion dams, submit shop drawings to the Engineer for review and approval. Submit shop drawings, as specified in PennDOT Publication 408/2016, Section 105.02(d), showing complete details, dimensions, size, and type of seal as well as other information and data necessary for the complete fabrication and erection of the dam.
C. Submit a plan to the Engineer showing and describing the demolition and removal methods to be used for removal of portions of the existing bridge, as indicated. Do not proceed with this demolition work until the plan has been reviewed and accepted. Within the plan, provide temporary shielding methods for the protection and safety of the general public and public utilities during demolition.

T.328.2 MATERIALS - In accordance with PennDOT Publication 408//2016, Section 1026.2, Section 705, PennDOT Standard Drawing BC-767M, and as follows:

A. Class AAAP Cement Concrete – PennDOT Publication 408/2016, Section 704 for deck concrete within blockouts.
B. Class AA Cement Concrete – PennDOT Publication 408/2016, Section 704 for barrier and backwall concrete within blockouts.
C. Neoprene Strip Seal and Lubricant Adhesive – PennDOT Publication 408/2016, Section 705.4(d), from a manufacturer listed in PennDOT Publication 35 (Bulletin 15).
D. Reinforcement Bars, Epoxy Coated – ASTM A615, Grade 60, in accordance with PennDOT Publication 408/2016, Section 1002.2.
E. Epoxy Bonding Compound – PennDOT Publication 408/2016, Section 1001.2(k).
F. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.
G. Metal Bridge Deck Forms – PennDOT Publication 408/2016, Section 1001.2(h).
H. Mechanical Splice System – PennDOT Publication 408/2016, Section 1002.2(c).
I. Barrier Sliding Plates – PennDOT Publication 408/2016, Section 1105.02(a)2, Grade 36, shop painted in accordance with PennDOT Publication 408/2016, Section 1060.
J. Paint.

1. Existing Steel Surfaces – See T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
2. New Structural Steel Surfaces – See PennDOT Publication 408/2016, Section 1060.
3. Paint color: Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

T.328.3 CONSTRUCTION

T.328.3.1 DEMOLITION

Remove existing expansion dam, and portions of existing deck, abutment backwall, and barriers, including barrier sliding plates, within blockout limits, as indicated in the plans, in accordance with Publication 408/2016, Section 1018.3 and this specification.

Limit pneumatic hammers or mechanical chipping tools used for removal of deck concrete over existing steel members to 30 ft-lb rated impact. Saw cut a neat line prior to impact tool removal of existing concrete.

Do not operate pneumatic hammers or mechanical chipping tools at an angle in excess of 45 degrees relative to the surface of the concrete.

Do not place pneumatic tools in direct contact with reinforcing steel that is to remain.

Use hand tools such as hammers and chisels, or small air chisels to remove final particles of unsound concrete or to provide necessary clearances around reinforcement bars.

Do not cause damage beyond the limits of removal. Repair any damage beyond limits of removal to the satisfaction of the Engineer at no additional cost to the Authority.

Coordinate expansion dam replacement work with superstructure repair work in the vicinity of expansion dams, including, but not limited to superstructure jacking and bearing resetting.

Electrical and other conduits are located within existing concrete barriers, and in some cases, within the thickened portion of deck slab within the limits of the deck blockout removal and reconstruction. Protect these conduits during demolition of existing and construction of new deck, abutment backwall, and

barriers within the limits of the blockouts. Repair any damage caused to these conduits, to the satisfaction of the Engineer, at no cost to the Authority.

Blasting is not permitted.

T.328.3.2 FABRICATION

Verify all dimensions in the field prior to fabrication for fit, to match roadway grades and cross- slopes, and as necessary to satisfactorily complete work.

Fabricate the expansion dams according to the shop drawings and as appropriate to match existing bridge deck grades and cross-slopes. Assemble the expansion joints with temporary angles for shipping.

Fabricate barrier steel sliding plates according to the shop drawings and as appropriate to match existing barrier dimensions, profiles and grades.

Verify location of existing electrical and other conduits located in barriers and deck prior to submission of expansion dam shop drawings. Modify steel extrusions and reinforcing steel spacing, as required, to accommodate existing conduits. Include steel extrusion modifications, as necessary, on the shop drawings.

T.328.3.3 INSTALLATION

Construct in accordance with PennDOT Publication 408/2016, Section 1026.3, applicable portions of Sections 1001 and 1040 and sections referenced therein, PennDOT Standard Drawing BC-767M, manufacturer's recommendations, as indicated and as follows:

Sandblast or waterblast to remove partially loosened chips of concrete. Sandblast, waterblast, or wire brush exposed reinforcement bars to remove rust and corrosion. Remove all portions of damaged or heavily corroded reinforcement bars, and replace with the same type of bars, as specified in Section 1002.3 and as directed. Replacement of corroded reinforcement is incidental to this item of work. Blow all removal areas clean with oil-free compressed air and protect them against any contaminate detrimental to the bond of the new concrete.

Before placing blockout concrete, clean and prepare exposed surfaces of existing concrete with an approved concrete bonding compound, place new deck, abutment backwall, and barrier concrete incorporating the new and existing reinforcing into the blockout pours.

Do not damage any of the existing reinforcement which is to remain. Mechanically clean any exposed reinforcement which is to remain to remove heavy rust, scale and loose concrete chips.

Before placing blockout concrete, clean and prepare exposed existing steel surfaces to be in contact with blockout concrete in accordance with T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES.

Provide worker protection and environmental management in accordance with T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Replace existing transverse reinforcement, including barrier stirrup reinforcement, where indicated, with new epoxy coated reinforcement. Mechanically clean and coat with epoxy reinforcing bar patching material any exposed reinforcing steel which is to remain. Cleaning and coating of exposed reinforcing steel is incidental to this item of work. Repair or replace any deck, abutment backwall, or barrier reinforcement to remain damaged during barrier and blockout concrete removal operations at no cost to the Authority.

Before installing the seal, clean metal surfaces in direct contact with the seal to remove foreign material and to provide for proper bond between the seal and the metal surfaces. Clean as specified in PennDOT Publication 408/2016, Section 1071.3(c)1.

Install new strip seal expansion dams. The seals shall be continuous over the full width of the superstructure. Do not splice the neoprene strip seal.

If stretching of the seal during installation is unavoidable, do not exceed 5% elongation.

The Authority will not accept cocked or twisted seal installation.

Install new steel sliding barrier plates on reconstructed portions of barriers.

Remove and replace seals that are damaged during installation at no additional cost to the Authority.

Protect the new expansion dams and new concrete within blockouts at expansion joints from damage during scarification, hydrodemolition, and all other construction activities. Repair any damage to the expansion dams or blockouts to the satisfaction of the Engineer at no cost to the Authority.

Satisfactorily dispose of debris resulting from the repair operation.

Flood gland with water after installation and inspect for leaks or damage. Repair leaks or damage to the satisfaction of the Engineer at no cost to the Authority.

Install the barrier sliding plates in accordance with PennDOT Publication 408/2016, Section 1050.3 and as indicated on the drawings.

Survey the existing joint prior to removing it, to establish finish joint elevations at critical locations.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.329 REPLACE TOOTH EXPANSION JOINT WITH MODULAR EXPANSION JOINT

T.329.1 GENERAL

T.329.1.1 DESCRIPTION: This work is the removal of existing tooth expansion joints at the abutments of the Westbound over Moyamensing Avenue Overpass and replacement with new strip seal modular expansion joints. This work includes removal of the existing expansion joints, including portions of the existing concrete deck, backwalls, and barriers, and the furnishing of materials, services, labor, tools, equipment, and incidentals necessary to design, fabricate, inspect, test and install the new expansion joints and expansion joint support beams, and reconstruct concrete deck, backwalls, and barriers with new sliding steel barrier plates, as indicated. This work also includes disposal of removed portions of deck, backwall, barrier and expansion joint elements.

T.329.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.314 – SCARIFICATION, 1" DEPTH
D. T.315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION
E. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
F. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
G. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
H. T.325 – EPOXY INJECTION CRACK REPAIR
I. T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
J. T.371– WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT
K. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.329.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. PennDOT Publication 15, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
4. PennDOT Standard Drawing BC-767M
5. PennDOT Standard Drawing BC-754M – Steel Diaphragms for Steel Beam/Girder Structures
6. PennDOT Standard Drawing RC-20M – Concrete Pavement Joints

T.329.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Prior to fabrication of the expansion dams, submit shop drawings to the Engineer for approval. Submit shop drawings, as specified in PennDOT Publication 408/2016, Section 105.02(d), showing complete details, dimensions, size, and type of seal as well as other information and data necessary for the complete fabrication and erection of the dam.
C. Submit a plan to the Engineer showing and describing the demolition and removal methods to be used for removal of portions of the existing bridge, as indicated. Do not proceed with this demolition work until the plan has been reviewed and accepted. Within the plan, provide temporary shielding methods for the protection and safety of the general public and public utilities during demolition.

T.329.2 MATERIALS – In accordance with PennDOT BC-767M, applicable portions of PennDOT Publication 408/2016, Section 1026.2 and as follows:

A. Class AAAP Cement Concrete – PennDOT Publication 408/2016, Section 704 for deck concrete within blockouts.
B. Class AA Cement Concrete – PennDOT Publication 408/2016, Section 704 for barrier and backwall concrete within blockouts.
C. Neoprene Strip Seal and Lubricant Adhesive – PennDOT Publication 408/2016, Section 705.4(d), from a manufacturer listed in PennDOT Publication 35 (Bulletin 15).
D. Reinforcement Bars, Epoxy Coated – ASTM A615, Grade 60, in accordance with PennDOT Publication 408/2016, Section 1002.2

E. Epoxy Bonding Compound – PennDOT Publication 408/2016, Section 1001.2(k)

F. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.

G. Metal Bridge Deck Forms – PennDOT Publication 408/2016, Section 1001.2(h)

H. Mechanical Splice System – PennDOT Publication 408/2016, Section 1002.2(c)

I. Barrier Sliding Plates – PennDOT Publication 408/2016, Section 1105.02(a)2, Grade 36, shop painted in accordance with PennDOT Publication 408/2016, Section 1060.

J. Fabricated Structural Steel – PennDOT Publication 408/2016, Section 1105.02(a), Grade 50.

K. High Strength Bolts – PennDOT Publication 408/2016, Section 1105.02(d).

L. Paint

1. Existing Steel Surfaces – See T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
2. New Steel Surfaces – See PennDOT Publication 408/2016, Section 1060.
3. Paint color: Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

T.329.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1026.3, the manufacturer's recommendations, and as follows:

T.329.3.1 GENERAL

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Verify all dimensions in the field prior to fabrication for fit, to match roadway grades and cross-slopes, and as necessary to satisfactorily complete work.

Verify location of existing electrical and other conduits located in barriers and prior to submission of the shop drawings. Modify steel extrusions and reinforcing steel spacing, as required, to accommodate existing conduits. Include steel extrusion modifications, as necessary, on the shop drawings.

T.329.3.2 DEMOLITION

Remove existing expansion joint, and portions of existing deck, backwalls, barriers, including barrier steel sliding plates, within blockout limits, as indicated in the plans in accordance with PennDOT Publication 408 Section 1018.3 and this specification.

Limit pneumatic hammers or mechanical chipping tools used for removal of deck concrete over existing steel members to 30 ft-lb rated impact. Saw cut a neat line prior to impact tool removal of existing concrete.

Take care so as not to damage any existing structural members to remain in place. Repair any damage done to the existing structure beyond the indicated removal limits to the satisfaction of the Engineer at no cost to the Authority. Notify the Engineer of other areas of damage observed during construction. Do not conduct work on these areas unless directed by the Engineer.

Do not damage any of the existing reinforcement which is to remain.

Provide work platforms and protection shields, as required.

Coordinate expansion joint replacement work with repair work in the vicinity of expansion joints, including, but not limited to, concrete repairs, superstructure jacking and bearing rehabilitation.

Temporarily support and protect existing scuppers and downspouts within blockouts.

Electrical conduits are located within existing concrete barriers. Protect these conduits during demolition of existing and construction of new barriers within the limits of the blockouts. Repair any damage caused to these conduits, to the satisfaction of the Engineer, at no cost to the Authority.

Blasting is not permitted.

T.329.3.3 DESIGN AND FABRICATION

Fabricate the modular expansion joints according to the shop drawings and as appropriate to match existing bridge deck grades and cross-slopes. Assemble the modular expansion joints with temporary angles for shipping.

Fabricate support beams according to the shop drawings and in accordance with PennDOT Publication 408/2016, Section 1105.

Fabricate the modular expansion joints to achieve the required opening dimension at 68 degrees F as shown on the plans.

Develop and submit details of new reinforcement bars within blockouts based on modular expansion joint support box locations as detailed by the modular expansion joint manufacturer.

Provide a modular expansion joint system that is capable of accommodating the structure movement of the modular expansion joint shown on the plans. Utilize a joint manufacturer possessing an AISC Simple Structure Category shop approval.

Fabricate a modular expansion joint system designed for HS-25 truck loading and impact in accordance with AASHTO LRFD Bridge Design Specifications and as modified by PennDOT Publication 15 (Design Manual Part 4), Current Edition. Submit, for the Engineer's review and approval, shop drawings, signed and sealed by a Professional Engineer registered in the states of Pennsylvania. Include the following on the shop drawings:

1. Plan, elevation, and section of the joint system and roadway width showing existing dimensions and tolerances to ensure proper fit-up with existing structure.
2. All ASTM, AASHTO or other material designations.
3. Method of installation, including but not limited to sequence, setting relative to temperature, anchorage during setting and installation at barriers.
4. Corrosion protection system.
5. Details of temporary support for shipping, handling and erection.

The design of the modular expansion joint system shall consist of a single layer preformed elastomeric joint seal mechanically held in place by steel edge and center beams. Each elastomeric sealing element shall be continuous. An independent support bar welded to the center beam shall individually support each machined or extruded transverse center beam. These support bars shall be suspended over the joint opening by sliding elastomeric bearings. The modular expansion joint system shall provide equidistant control of the elastomeric seals. This equidistant control system shall be the type that develops its maximum compressive force when the joint is at its maximum opening.

Temporary attachments required for shipping, handling and erection are to be removed by chipping connection welds and grinding surfaces smooth.

The modular expansion joint manufacturer shall shop prepare, as necessary, all phase construction locations to be field welded. A splice plate design for alignment of center beams is required. The manufacturer shall shop prepare all field weld connections of the edge and center beams. The splice plate

template shall be factory attached to the first phase of all field center beam connections.

Modular expansion joint systems shall be supplied with prestressing hardware for mechanically opening or closing the assembly for ambient temperature adjustments. The manufacturer shall provide factory attached lifting devices and brackets to facilitate field handling and grade adjustments.

Only manufacturers whose joint designs are successfully fatigue tested and documented by an independent agency in accordance with NCHRP 402 Appendix A will be allowed to design, manufacture and supply modular expansion joint systems as shown on the contract plans.

Shop drawings shall include a means to cover the interior opening of the support boxes to prevent animal intrusion and be removable for inspections.

The manufacturer shall submit to the Engineer a written maintenance manual and part replacement plan at the time of the shop drawing submission. Included in the submission shall be list of parts to be inspected, acceptable wear tolerances and the method of part replacement. The manufacturer shall conduct a pre-installation meeting to train the Authority's construction inspectors and maintenance personnel on the installation and maintenance of the modular expansion joint system.

T.329.3.4 INSTALLATION

Before placing blockout concrete, clean and prepare exposed existing steel surfaces to be in contact with blockout concrete in accordance with T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES.

Provide worker protection and environmental management in accordance with T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Do not construct modular joint blockouts until modular joint and support beam design and shop drawings are approved by the Engineer.

Re-construct concrete deck, abutment backwall, and barriers within limits of blockout in accordance with PennDOT Publication 408/2016, Sections 1001 and 1040 and referenced sections therein.

Before placing blockout concrete, clean and prepare exposed surfaces of existing concrete with an approved concrete bonding compound, place new deck, abutment backwall, and barrier concrete incorporating the new and

existing reinforcing into the blockout pours, and install new strip seals within the new extrusions.

Replace existing transverse reinforcement, including barrier stirrup reinforcement, with new epoxy-coated reinforcement. Mechanically clean and coat with epoxy reinforcing bar patching material any exposed reinforcing steel which is to remain. Cleaning and coating of exposed reinforcing steel is incidental to this item of work. Repair or replace any deck, abutment backwall, or barrier reinforcement damaged during the barrier and blockout removal operations at no cost to the Authority.

Install new modular expansion joints. The seals shall be continuous over the full width of the superstructure. Install new sliding steel barrier plates on reconstructed portions of barriers.

Remove and replace seals that are damaged during installation at no additional cost to the Authority.

Have a modular joint manufacturer's representative on site to approve the installation of the expansion joint.

Install deck, abutment backwall, and barrier blockout reinforcement in such a manner so that it does not interfere with the installation of the expansion joint.

Coordinate work with substructure concrete repairs in the vicinity of the joints.

Protect the new expansion joints and new concrete within blockouts at expansion joints from damage during scarification, hydrodemolition and all other construction activities. Repair any damage to the joints or blockouts to the satisfaction of the Engineer and no cost to the Authority.

Satisfactorily dispose of debris resulting from the repair operation.

Finished Modular Expansion Joint Installation Tolerances:

1. There shall be no more than 3 mm (1⁄8 in.) difference in elevation among the tops of any of the center beams or edge beams. This variation shall be measured vertically from a straight line connecting the top of the deck profile on each side of the modular expansion joint.
2. There shall be no more than 13 mm (1⁄2 in.) difference among gap widths at either end of a seal or among the multiple gaps of the modular expansion joint.

END OF SECTION

T.330 LONGITUDINAL JOINT SEALING, BRIDGE DECK

T.330.1 GENERAL

T.330.1.1 DESCRIPTION: This work is the cleaning and sealing of the armored longitudinal joint in the westbound deck of the Randolph Street Overpass. Work includes removal and disposal of existing joint sealing material, and placement of new closed cell backer rods and joint sealant in accordance with the manufacturer's recommendations.

T.330.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.327 – REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS
D. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.330.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.330.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.330.2 MATERIALS – From a manufacturer listed in PennDOT Publication 35 (Bulletin 15):

A. Joint Backing Material, PennDOT Publication 408/2016, Section 705.9 and compatible with the joint sealant used.

B. Joint Sealant, PennDOT Publication 408/2016, Section 705.4(b) or (c).

T.330.3 CONSTRUCTION

Verify all dimensions in the field necessary to satisfactorily complete the work prior to ordering material or starting the joint sealing work. Measure existing joint openings and order backer rods sized for the anticipated joint opening at the time of installation.

Remove and satisfactorily dispose of existing joint sealing materials and all other debris resulting from the work.

Clean the joint opening and install backer rods in accordance with the manufacturer's recommendations. Place backer rods and joint sealant only after all other work that may compromise the effectiveness of the new joint seal is complete. This work includes, but is not limited to expansion joint gland replacements, bridge scarification and hydrodemolition operations. Repair any damage to the satisfaction of the Engineer at no cost to the Authority.

Place joint sealant in accordance with the manufacturer's recommendations. Place to a depth in accordance with the Manufacturer's recommendations and tool flush or slightly recessed with the top of the joint armor.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.331 LONGITUDINAL JOINT SEALING, SPLIT GLARE SCREEN MEDIAN BARRIER

T.331.1 GENERAL

T.331.1.1 DESCRIPTION: This work is the sealing of the open longitudinal joint at concrete split glare screen median barriers. Work includes removal and disposal of existing joint filler material, as required, and placement of new closed cell backer rods and joint sealant in accordance with the manufacturer's recommendations. This work applies to the following bridges: Seventh Street Overpass, Tenth Street Overpass, and Broad Street Overpass.

T.331.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.331.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.331.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.331.2 MATERIALS – From a manufacturer listed in PennDOT Publication 35 (Bulletin 15):

A. Joint Backing Material, PennDOT Publication 408/2016, Section 705.9 and compatible with the joint sealant used.

B. Joint Sealant, PennDOT Publication 408/2016, Section 705.4(b) or (c).

T.331.3 CONSTRUCTION

Verify all dimensions in the field necessary to satisfactorily complete the work prior to ordering material or starting the joint sealing work. Measure existing joint openings and order backer rods sized for the anticipated joint opening at the time of installation.

Remove and satisfactorily dispose of existing joint filler materials and all other debris resulting from the work.

Clean the joint opening and install backer rod in accordance with the manufacturer's recommendations. Place backer rods and joint sealant only after all other work that may compromise the effectiveness of the new joint seal is complete. This work includes, but is not limited to, concrete barrier repairs, expansion joint replacements, and superstructure jacking operations.

Place joint sealant in accordance with the manufacturer's recommendations. Place to a depth in accordance with the manufacturer's recommendations and tool flush or slightly recessed with the top of the median barrier.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.332 JOINT SEALING, SUBSTRUCTURE

T.332.1 GENERAL

T.332.1.1 DESCRIPTION: This work is the cleaning and sealing of existing horizontal and/or vertical expansion joints in abutment backwalls, beam seats, and stems, walls, wingwalls, pier beam seats and stems, at the base of piers and full height abutments, and at pedestrian underpasses, as indicated or directed. Work includes removal and disposal of existing joint sealant, and placement of closed cell backer rods, as required, and joint sealant in accordance with the manufacturer's recommendations.

T.332.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
D. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
E. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
F. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.332.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.332.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.332.2 MATERIALS – From a manufacturer listed in PennDOT Publication 35 (Bulletin 15):

A. Joint Backing Material, PennDOT Publication 408/2016, Section 705.9 and compatible with the joint sealant used.

B. Joint Sealant, PennDOT Publication 408/2016, Section 705.8(b).

T.332.3 CONSTRUCTION

Verify all dimensions in the field necessary to satisfactorily complete the work prior to ordering material or starting the joint sealing work. Measure existing joint openings and order backer rods sized for the anticipated joint opening at the time of installation.

Remove and satisfactorily dispose of existing joint sealing materials and all other debris resulting from the work.

Clean the joint opening and install backer rods in accordance with the manufacturer's recommendations. Place backer rods and joint sealant only after all other work that may compromise the effectiveness of the new joint seal is complete. This work includes, but is not limited to reinforced concrete repairs and application of penetrating sealers and anti-graffiti coatings. Repair any damage to the satisfaction of the Engineer at no cost to the Authority.

Place joint sealant in accordance with the manufacturer's recommendations. Place to a depth in accordance with the manufacturer's recommendations and tool flush or slightly recessed with the top of the joint.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.333 SUBSTRUCTURE MORTAR REPOINTING

T.333.1 GENERAL

T.333.1.1 DESCRIPTION: This work is the removal, cleaning, and repointing of deteriorated mortar in stone masonry and mortared concrete joints at bridges and pedestrian underpasses, as indicated or directed.

T.333.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.333.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.333.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit mortar samples to the Engineer for approval for color, joint style, and finish. The Engineer will give final acceptance and approval of the sample. Do not proceed with the pointing until written approval is received.
C. Have masonry work performed by competent and experienced masons. Submit qualifications of individuals performing the work to the Engineer for review and approval prior to the start of work.

T.333.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 705.7, Section 1017.2 and as follows:

A. Dye – Add cement tint to the mortar mix to color the mortar to match the color of the mortar to remain.

Match finish color of pointing to existing color. Provide samples of color, composition, and finish to the Engineer for analysis and approval. Do not begin repointing until color and method are approved by the Engineer.

T.333.3 CONSTRUCTION

Only joints with loose, missing or deteriorated mortar are to be repointed. The Contractor shall mark out areas for repointing. The limits of mortar repair shall be verified, measured and approved by the Engineer prior to the Contractor starting repair work. The Contractor is to provide the equipment and labor for the Engineer to access the marked-out areas.

Remove deteriorated mortar from existing masonry using hand chisels. Do not use power tools.

Thoroughly clean the exposed masonry joints of loose mortar and dirt to a depth of not less than two times the joint width. Use pressured air, water, or both for removal of loose debris in joints that cannot be removed by other means. Do not damage or scar masonry to remain.

Saturate the joints with clean water, fill with mortar, and ram in place. Finish with a pointing tool to match the existing mortar joints. Provide finish joints at least one-half inch deep and match existing joints in color, texture, and tooling. Remove and replace damaged pointing. Keep masonry wet when pointing. Work must be neat and match approved samples.

Do not point in freezing weather. Cure in cool and cold weather as specified in PennDOT Publication 408/2016, Section 1001.3(p). Protect pointing from weather and keep wet for a period of at least three (3) days.

After completing the pointing, clean the exposed surrounding masonry or concrete surfaces as directed by the Engineer.

Properly dispose of all material and waste resulting from the repair work.

Perform work in accordance with the traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.334 RECONSTRUCT CHEEKWALL

T.334.1 GENERAL

T.334.1.1 DESCRIPTION: This work is the demolition, removal and replacement of the concrete cheekwall at the west end of the north abutment of Ramp M, as indicated.

T.334.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.334.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 15, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.334.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit a plan showing and describing the proposed method to be used for removal and reconstruction of the cheekwall.
C. Submit reinforcing bar schedule based on field measurements and submit to the Engineer for approval.
D. If an epoxy anchoring system is to be used, submit manufacturer product data, the procedure to be used, and all other information pertinent to the anchoring system, including, but not limited to embedment length, for review and approval.

T.334.2 MATERIALS

A. Class AA Concrete – PennDOT Publication 408/2016, Section 704.
B. Forms – PennDOT Publication 408/2016, Section 1001.2(h).
C. Reinforcement Bars, Epoxy Coated – PennDOT Publication 408/2016, Section 1002.2.
D. Nonshrink Grout – In accordance with PennDOT Publication 408/2016, Section 1001.2(e).
E. Epoxy Anchoring System – In accordance with PennDOT Publication 35 (Bulletin 15).
F. Epoxy Bonding Compound – Type II, Grade 2, ASTM C 881 epoxy as specified in PennDOT Publication 408/2016, Section 706.
G. Epoxy Reinforcing Bar Patching Material – PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.

T.334.3 CONSTRUCTION

Verify all dimensions in the field required to satisfactorily complete the work.

Remove and reconstruct existing cheekwall in accordance with PennDOT Publication 408/2016, Section 1018.3, and as indicated on the Contract Drawings.

Perform concrete work for the cheekwall reconstruction in accordance with PennDOT Publication 408/2016, Section 1001.3.

Maintain existing reinforcement bars as indicated. Place new reinforcement bars and splice to existing as indicated.

Mechanically clean and apply epoxy reinforcing steel patching material to any exposed reinforcement which is to remain.

Drill dowel holes for the construction of the new cheekwall in accordance with PennDOT Publication 408/2016, Section 1003.3.

Grout reinforcement in accordance with PennDOT Publication 408/2016, Section 1001.3, or use approved epoxy anchoring system.

Coat roughened concrete surfaces with epoxy bonding compound immediately prior to concrete placement.

Finish and cure concrete in accordance with PennDOT Publication 408/2016, Section 1001.

Exercise care so as not to damage the existing stone facing or other existing structure elements to remain. Removal, reconstruction and reattachment of existing stone facing, if required, are incidental to this item of work.

Repair any damage caused to portions of the existing structure to remain to the satisfaction of the Engineer at no cost to the Authority.

Satisfactorily dispose of all demolished materials resulting from the work.

Provide work platforms and protection shields, as required.

END OF SECTION

T.335 GRANITE BLOCK SLOPE WALL REPAIR

T.335.1 GENERAL

T.335.1.1 DESCRIPTION: This work is the resetting of loose or settled granite blocks and the replacement of missing granite blocks at bridge granite block slope walls, as indicated, including filling and grading of the embankment, as required, and mortaring the blocks in place.

T.335.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.336 – GRANITE BLOCK SLOPE WALL MORTAR REPAIR
C. T.337 – SLOPE WALL EDGE CONSTRUCTION

T.335.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.335.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 674.2 and as follows:

T.335.2.1 GRANITE BLOCKS

A. Salvaged Granite Blocks from the Site – Existing granite blocks along the edges of several bridge slope walls are being removed for the construction of new concrete slope wall edges as part of ITEM 337 – SLOPE WALL EDGE CONSTRUCTION. Reuse granite blocks removed from these locations to replace any missing granite blocks. If additional blocks are needed, provide blocks that are of acceptable quality, free from structural defects and foreign substances, and that nearly match the existing blocks.

B. New Granite Blocks – For bidding purposes, the Contractor is to assume that a total of 100 granite blocks, in addition to those reused from other work, will be required. Stones to closely match the type, size, and color of existing stones. Provide a sample of the new stones, as required, to demonstrate that they nearly match the remaining stones.

T.335.2.2 MORTAR

A. In accordance with PennDOT Publication 408/2016, Section 674.2(b).
B. Dyes. Add cement tint to the mortar mix, as required, to nearly match the existing mortar in color. Prepare a sample of tinted mortar for the mortar repairs to verify that the mortar nearly matches the existing mortar in color.

T.335.2.3 OTHER MATERIAL

A. Premolded Expansion Joint Filler – PennDOT Publication 408/2016, Section 705.1.
B. Subbase – PennDOT Publication 408/2016, Section 703.2, Type 2A Coarse Aggregate.

T.335.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 674.3 and as follows:

Contractor is to mark-out areas of settled or missing granite blocks and obtain approval of the repair areas from the Engineer prior to performing any resetting or replacement work.

Temporarily remove settled or missing granite blocks.

Clean mortar from existing blocks.

Excavate and fill-in settled areas with additional subbase, as required. Compact subbase and set stones as specified in PennDOT Publication 408/2016, Section 674.3(a).

Install blocks to the proper grade and elevation to tie into adjacent sections of the wall that are to remain. Use spacers to hold the reset blocks in their final position. Space the new blocks to nearly match the existing block pattern. Straighten the courses by striking lightly with a rubber mallet or sledgehammer against a suitable wood block. Match existing joint spacing. Do not use cracked or defective blocks.

Roll or tamp the blocks to a firm, uniform elevation.

Thoroughly clean the joints. Wash and saturate the granite blocks.

Place mortar in accordance with PennDOT Publication 408/2016, Section 674.3(b).

END OF SECTION

T.336 GRANITE BLOCK SLOPE WALL MORTAR REPAIR

T.336.1 GENERAL

T.336.1.1 DESCRIPTION: This work is repairing areas of deteriorated or missing mortar at bridge granite block slope walls, as indicated or directed.

T.336.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.335 – GRANITE BLOCK SLOPE WALL REPAIR

T.336.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.336.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 674.2 and as modified as follows:

A. Mortar – PennDOT Publication 408/2016, Section 674.2(b).
B. Dyes – Add cement tint to the mortar mix, as required, to nearly match the existing mortar in color. Prepare a sample of tinted mortar for the mortar repairs to verify that the mortar nearly matches the existing mortar in color.

T.336.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 674.3(b) and as follows:

Contractor is to mark-out areas of deteriorated or missing mortar and obtain approval of the repair areas from the Engineer prior to performing any repair work.

Thoroughly clean the joints. Wash and saturate the granite block.

END OF SECTION

T.337 SLOPE WALL EDGE CONSTRUCTION

T.337.1 GENERAL

T.337.1.1 DESCRIPTION: This work is the construction of cast-in-place cement concrete slab slope wall edges at existing bridge granite block slope walls, as indicated. Work includes the removal of existing granite blocks, cement concrete, rip-rap, or other existing slope paving/protection materials within the limits of slope wall edge construction, filling and grading of the embankment, as required, and construction of new cast-in-place cement concrete slab slope wall edges. Precast cement concrete block slope walls are not permitted. The existing granite blocks have an average thickness of approximately 5-inches.

T.337.1.2 RELATED SECTIONS

A. T.335 – GRANITE BLOCK SLOPE WALL REPAIR
B. T.336 – GRANITE BLOCK SLOPE WALL MORTAR REPAIR
C. T.75 – RIGHT-OF-WAY FENCE, TYPE 1
D. T.26 – CLASS 2 EXCAVATION
E. T.29 – FOREIGN BORROW EXCAVATION
F. T.28 – TOPSOIL, FURNISHED AND PLACED
G. T.212 – SEEDING AND SOIL SUPPLEMENTS, FORMULA L
H. T.401 – HEALTH AND SAFETY PLAN
I. T.402 – WASTE MANAGEMENT PLAN
J. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
K. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.337.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PennDOT Bridge Construction Standard (BC's), Drawing BC-731M – Cement Concrete Slope Wall

T.337.2 **MATERIALS –** In accordance with PennDOT Publication 408/2016, Section 673.2 and as follows:

A. Subbase – In accordance with PennDOT Publication 408/2016, Section 703.2, Type 2A Coarse Aggregate.

T.337.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 673.3, Section 1001.3, PennDOT Standard Drawing BC-731M, and as follows:

Contractor is to mark-out areas/limits of existing slope wall edge material to be removed and obtain approval of the repair areas from the Engineer prior to performing the work.

Remove existing slope wall edge materials, including granite blocks, cement concrete, rip rap or other existing slope paving/protection materials within the limits of new slope wall edge reconstruction.

Construct cast-in-place cement concrete slab slope wall edges in accordance with PennDOT Publication 408/2016, Section 673.3(b).

Construct cast-in-place cement concrete slab slope wall to the proper grade and elevation to tie into adjacent sections of the wall that are to remain.

Granite blocks removed for construction of new slope wall edges will be the property of the Authority.

Properly dispose of all non-soil related material removed and not reused to the satisfaction of the Engineer. Management of any existing embankment material to be performed in accordance with T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

The temporary removal and replacement or removal and relocation of portions of existing chain link fence may be required to facilitate this work. Replace fence, fence posts, and fence post foundations as required, in accordance with T.75 – RIGHT-OF-WAY FENCE, TYPE 1.

Excavation for temporary fence removal or fence replacement shall be in accordance with T.26 – CLASS 2 EXCAVATION.

Fill for any temporary fence removal or fence replacement shall be in accordance with T.29 – FOREIGN BORROW EXCAVATION.

Topsoil for any temporary fence removal or fence replacement shall be in accordance with T.28 – TOPOSOIL, FURNISHED AND PLACED.

Seeding for any temporary fence removal or fence replacement shall be in accordance with T.212 – SEEDING AND SOIL SUPPLEMENTS FORMULA L.

END OF SECTION

T.338 CLEAN DRAINAGE SYSTEM

T.338.1 GENERAL

T.338.1.1 DESCRIPTION: The work is the cleaning and flushing of the existing bridge and pedestrian underpass drainage systems.

The bridge drainage systems include bridge scuppers, drain boxes, and downspouting. The systems extend from deck level to the splash blocks or sewer tie-ins. The work applies to the following bridges: Broad Street, Ramp M, Eastbound over Moyamensing Avenue, Westbound over Moyamensing Avenue, Eastbound over Passyunk Avenue, and Westbound over Passyunk Avenue.

The pedestrian underpass drainage system includes two existing drainage inlets and associated drainage piping located at the low point within the Pedestrian Underpass at Ramp N.

Conform to requirements of Section T.167.

T.338.1.2 RELATED SECTIONS

A. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
B. T.340 – MODIFY DRAINAGE SYSTEM
C. T.343 – REPAIR DRAINAGE SYSTEM

T.338.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.338.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 720.2.

T.338.3 CONSTRUCTION

Flush and clean existing scuppers, drain boxes, downspouting, inlets and piping as indicated or directed.

Repair any damage resulting from the cleaning operations at no cost to the Authority.

Flush system until free flow of water is obtained.

Satisfactorily dispose of material removed from the scuppers, drain boxes, and downspouting.

Demonstrate to the Engineer that the existing pipes are clear and free flowing.

Be responsible for the collection, removal and proper disposal of waste generated during the cleaning process.

Coordinate cleaning of the drainage systems with existing drainage system modifications and repairs.

During the cleaning and flushing operations, monitor the drainage system for areas of leaking pipes or damaged drainage system elements. Notify the Engineer of leaking pipes or damaged drainage system elements discovered prior to or during the cleaning operations. Do not conduct repair work on these areas unless directed by the Engineer.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

END OF SECTION

T.339 CLEAN DRAINAGE SYSTEM, CSX RAILROAD OVERPASS

T.339.1 GENERAL

T.339.1.1 DESCRIPTION: The work is the cleaning and flushing of four (4) existing 6-inch diameter drains and associated drainage pipes located within the triangular-shaped deck extensions of the CSX Railroad Overpass, as indicated. Drainage pipes extend from the floor drains, through existing concrete piers and abutments, to ground level. The drains are ballast-covered and located outside of the railroad track protective barriers.

T.339.1.2 RELATED SECTIONS

A. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
B. T.341 – REPLACE ROOF DRAIN, CSX RAILROAD OVERPASS
C. T.344 – DEBRIS REMOVAL
D. T.399 – CSX COORDINATION

T.339.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.339.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 720.2.

T.339.3 CONSTRUCTION

Temporarily remove and set aside existing ballast in the vicinity of the drains to expose the drains for cleaning operations. Remove existing vegetation in the vicinity of the drains, as required.

Flush and clean existing drains and associated drainage pipes. Existing drainage pipes are located within concrete piers and abutments.

Flush system until free flow of water is obtained.

Satisfactorily dispose of material removed from the drains and drainage pipes.

Demonstrate to the Engineer that the existing pipes are clear and free flowing.

Be responsible for the collection, removal and proper disposal of bridge waste generated during the cleaning process.

Coordinate cleaning of the drainage systems with replacement of the existing roof drains.

Upon completion of the repairs, restore temporarily removed ballast to original location.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Perform work in accordance with Item 399 – CSX COORDINATION. Conduct operations so as not to interfere with, interrupt, or endanger the operation of trains or damage, destroy, or endanger the integrity of railroad facilities.

END OF SECTION

T.340 MODIFY DRAINAGE SYSTEM

T.340.1 GENERAL

T.340.1.1 DESCRIPTION: This work is removing existing downspouting from below existing scuppers to the top of existing substructure units and furnishing and replacing with new galvanized steel downspouting. The existing downspouting consists of external downspouting from below existing scuppers to the top of the existing substructure units from which point the downspouting is cast into the existing substructure unit and continues in the form of an internal drainage system. New downspouting is to be an external drainage system from below existing scuppers to ground level and sewer tie-in. Work also includes plugging/capping and filling the existing (abandoned) drainage pipes within the substructure units with concrete, as indicated. This work applies to the following bridge: Westbound over Moyamensing Avenue Overpass.

T.340.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.173 – REPAIR SEWER CONNECTION
D. T.367 – FILL DRAINAGE PIPE WITH CONCRETE
E. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.340.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PennDOT Standard Drawing BC-751M

T.340.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit shop drawings with all pertinent information and for all components

of the new drainage system, including, but not limited to downspouting, drainage boxes, connections, and miscellaneous components to the Engineer for review and approval.

C. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.
D. Submit certification that the products supplied conform to the specified requirements.
E. Submit a plan for removal and capping of the existing drainage system and installation of new drainage system to the Engineer for review and approval.
F. Submit a plan for filling the existing drainage pipes with concrete to the Engineer for review and approval.
G. Submit a plan for tie-in of new drainage system to existing network of storm drainage piping and/or manholes.

T.340.2 **MATERIALS –** In accordance with PennDOT Publication 408/2016, Section 1051.2 and PennDOT Standard Drawing BC-751M and as follows:

A. Downspouting – Galvanized steel pipe and fittings, 10" diameter, and as shown on PennDOT Standard Drawing BC-751M. Fiberglass and PVC is not permitted.
B. Couplings – Welded or mechanically grooved couplings as shown on PennDOT Standard Drawing BC-751M
C. Clean-out Plugs - As shown on PennDOT Standard Drawing BC-751M
D. Adhesive Anchor Bolts – As shown on PennDOT Standard Drawing BC-751M and per manufacturer's specifications
E. Non-Shrink Epoxy Grout – PennDOT Publication 35 (Bulletin 15) approved
F. Drain Boxes - As shown on PennDOT Standard Drawing BC-751M
G. High-Strength Bolts, Nuts, and Washers – In accordance with PennDOT Publication 408/2016, Section 1105.02(d), ASTM A325 bolts
H. Fabricated Structural Steel – PennDOT Publication 408/2016, Section 1105
I. Water – PennDOT Publication 408/2016, Section 720.2
J. Class A Cement Concrete – PennDOT Publication 408/2016, Section 704.

T.340.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1051.3 and PennDOT Standard Drawing BC-751M, and as follows:

T.340.3.1 GENERAL

Perform work in accordance with the staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

Coordinate work with other work that may affect the newly installed drainage system, including, but not limited to reinforced concrete repairs and bridge superstructure jacking.

Field verify size, dimensions, and types of materials, as necessary to satisfactorily complete the work.

Field-verify all pipe lengths, angles, and locations of drain boxes, support members, and brackets prior to fabrication and beginning this work. Include cleanout plugs and fittings, as required.

T.340. 3.2 REMOVAL AND REPLACEMENT

Removal - Remove existing drainage system, as indicated, and in accordance with PennDOT Publication 408/2016, Section 1018. Satisfactorily dispose of removed portions of drainage system. Provide temporary downspouts as required to perform the work. Submit the temporary downspout details to the Engineer for review and approval. Do not block the scuppers during construction. Satisfactorily dispose of removed portions of drainage system.

Installation - Install downspout pipes, drainage boxes, and drain support members and brackets as indicated, connecting new downspout pipes to existing scuppers and substructure units. Provide additional support brackets and hangers, as required. Position drain boxes and support brackets so adhesive anchors are installed in solid concrete. Use a pachometer to locate existing reinforcing steel prior to anchor bolt installation. Patch any previous attachment holes in the concrete with epoxy grout. Repair all damaged galvanized surfaces of the downspouting system in accordance with PennDOT Publication 408/2016, Section 1105.02(s).2 at no additional cost to the Authority.

Cleaning - After the installation of the new system is complete (including sewer tie-ins, as required), remove and properly dispose of any existing debris that has entered the drainage system. Then, discharge a sufficient volume of water into the scuppers to demonstrate that the system is clear and functioning properly.

Repair or replace any portions of the existing structure or drainage system to remain that are damaged by the repair operations to the satisfaction of the Engineer at no cost to the Authority.

Connection of new downspouts to the existing roadway sewer system is part of Item 173 – REPAIR SEWER CONNECTION.

END OF SECTION

T.341 REPLACE ROOF DRAIN, CSX RAILROAD OVERPASS

T.341.1 GENERAL

T.341.1.1 DESCRIPTION: This work is the replacement of four (4) existing roof drains located within the triangular-shaped deck extensions of the CSX Railroad Overpass, as indicated. The drains are ballast-covered and located outside of the railroad track protective barriers.

T.341.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.339 – CLEAN DRAINAGE SYSTEM, CSX RAILROAD OVERPASS
D. T.344 – DEBRIS REMOVAL
E. T.399 – CSX COORDINATION

T.341.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.341.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit shop drawings for the roof drain to the Engineer for approval. Confirm roof drain compatibility with existing drainage system prior to submitting shop drawings.

T.341.2 MATERIALS

A. Roof Drain: Replace existing roof drain with the following:

    Josam 28600-AE Series, Large Sump, FLO-SET with –AE Threaded Adjustable Ext.

Josam Company
525 West Highway 20
Michigan City, IN 46360

or Approved Equal

T.341.3 CONSTRUCTION

Temporarily remove and set aside existing ballast in the vicinity of the drains to expose the drains for roof drain replacement operations. Remove existing vegetation in the vicinity of the drains, as required.

Field verify and measure existing roof drains to confirm new roof drain compatibility with the existing drainage system.

Remove existing roof drains and replace with new roof drains. Existing drainage pipes are to remain.

Satisfactorily dispose of removed material.

Coordinate replacement of roof drains with the cleaning of the drainage system.

Upon completion of the repairs, restore temporarily removed ballast to original location.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Perform work in accordance with Item 399 – CSX COORDINATION. Conduct operations so as not to interfere with, interrupt, or endanger the operation of trains or damage, destroy, or endanger the integrity of railroad facilities.

END OF SECTION

T.342 REPLACE FLOOR DRAIN DOWNSPOUT, RANDOLPH STREET OVERPASS

T.342.1 GENERAL

T.342.1.1 DESCRIPTION: This work is removing the existing 6-inch diameter PVC downspouting at the floor drain at the southeast corner of the Randolph Street Overpass and furnishing and replacing with new 6-inch PVC downspouting, connecting to existing downspouting, as indicated or directed. Work includes removal and replacement of existing downspout and downspout connections, including, but not limited to, fittings, hardware, threaded rods, pipe clamp bars, and bolts and nuts.

T.342.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.337 – SLOPE WALL EDGE CONSTRUCTION

T.342.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Standard Drawing BC-751M

T.342.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit shop drawings with all pertinent information and for all components of the new floor drain downspout system, including, but not limited to downspouting, connections, and miscellaneous components.
C. Submit manufacturer's descriptive product data and current specifications covering products and installation instructions.
    1. Submit certification that the products supplied conform to the specified requirements.

T.342.2 **MATERIALS –** In accordance with PennDOT Publication 408/2016, Section 1051.2 and PennDOT Standard Drawing BC-751M and as follows:

A. Downspouting – PVC pipe. Galvanized steel and fiberglass pipe are not permitted.
B. Couplings – Mechanical couplings as shown on PennDOT Standard Drawing BC-751M.
C. Threaded Rods – As shown on PennDOT Standard Drawing BC-751M and per manufacturer's specifications.
D. Nuts, and Washers – PennDOT Publication 408/2016, Section 1105.02(d), ASTM A325 bolts
E. Fabricated Structural Steel – PennDOT Publication 408/2016, Section 1105
F. Water – PennDOT Publication 408/2016, Section 720.2

T.342.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1051.3, Section 1105.3, PennDOT Standard Drawing BC-751M, and as follows:

T.342.3.1 GENERAL

Perform work in accordance with the staging indicated on the Traffic Control Plans.

Coordinate work with other work that may affect the newly installed drainage system, including, but not limited to, slope wall edge construction and bridge superstructure jacking.

Field verify sizes, dimensions, and types of materials, as necessary to satisfactorily complete the work prior to ordering materials.

T.342.3.2 REMOVAL AND REPLACEMENT

Removal - Remove existing downspout and downspout components, as indicated. Satisfactorily dispose of removed portions of downspouting.

Installation - Install downspout and downspout components.

Cleaning - After the installation of the new system is complete, discharge a sufficient volume of water into the floor drain to clean any remaining residue and to demonstrate that the system is clear and functioning properly. Dispose of any material cleaned from the drainage system in a satisfactory manner. Demonstrate to the Engineer that the floor drain downspout is clear and free flowing.

END OF SECTION

T.343 REPAIR DRAINAGE SYSTEM

T.343.1 GENERAL

T.343.1.1 DESCRIPTION: This work is the repairing of the existing bridge drainage system. Work includes the replacement of missing and tightening of loose drainage box and downspout connection bolts, as indicated or directed.

T.343.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.338 – CLEAN DRAINAGE SYSTEM
D. T.340 – MODIFY DRAINAGE SYSTEM
E. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.343.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Standard Drawing BC-751M

T.343.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit a procedure for the drainage system repairs to the Engineer for approval.

T.343.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 1051.2 and PennDOT Standard Drawing BC-751M.

T.343.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1051.3, Section 1056.3, PennDOT Standard Drawing BC-751M, and as follows:

Perform work in accordance with the staging indicated on the Traffic Control Plans.

Coordinate work with other work that may affect the repaired drainage system connections, including, but not limited to bridge drainage system cleaning, drainage system modifications, and bridge superstructure jacking.

Field verify sizes, dimensions, and types of materials, as necessary to satisfactorily complete the work.

Provide work platforms and protection shields, as required.

END OF SECTION

T.344 DEBRIS REMOVAL

T.344.1 GENERAL

T.344.1.1 DESCRIPTION – This work is the removal and disposal of existing miscellaneous debris in the form of dirt, vegetation, rubbish, junk, dislodged or detached pieces of concrete, steel or wood, or other objectionable materials, etc. from bridges and pedestrian underpasses, as indicated or directed. This work includes the removal and disposal of miscellaneous debris from, but not limited to, bridge superstructures and substructures, including abutment beam seats, abutment beam seat drainage troughs, pier caps, slope walls, deck extensions (at Randolph Street Overpass and CSX Railroad Overpass), pedestrian underpasses, and pedestrian underpass drainage troughs.

T.344.1.2 RELATED SECTIONS

A. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
B. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.344.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.
    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.344.2 MATERIALS – Not Used

T.344.3 CONSTRUCTION –

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

Dispose of material in an acceptable manner and in an approved waste area.

Comply with the requirements of the Air Pollution Control Act (Act 245-1972, or as amended), the Solid Waste Management Act (Act 97-1980, or as amended),

and the permits specified in PennDOT Publication 408/2016, Section 107.27(a), as required.

Burning of debris is not allowed on this project.

END OF SECTION

T.345 – T.353 JACKING BRIDGE SUPERSTRUCTURE

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 345	**JACKING BRIDGE SUPERSTRUCTURE – RANDOLPH STREET**
ITEM 346	**JACKING BRIDGE SUPERSTRUCTURE – SEVENTH STREET**
ITEM 347	**JACKING BRIDGE SUPERSTRUCTURE – TENTH STREET**
ITEM 348	**JACKING BRIDGE SUPERSTRUCTURE – BROAD STREET**
ITEM 349	**JACKING BRIDGE SUPERSTRUCTURE – RAMP K-L**
ITEM 350	**JACKING BRIDGE SUPERSTRUCTURE – RAMP M**
ITEM 351	**JACKING BRIDGE SUPERSTRUCTURE – EB OVER MOYAMENSING**
ITEM 352	**JACKING BRIDGE SUPERSTRUCTURE – WB OVER MOYAMENSING**
ITEM 353	**JACKING BRIDGE SUPERSTRUCTURE – EB OVER PASSYUNK**

T.345.1 GENERAL

T.345.1.1 DESCRIPTION: This work consists of the temporary support and jacking operations required to remove load from the existing bearings and/or raise the existing superstructure as required to perform bearing rehabilitation/repair work as indicated in the Contract Drawings.

This work includes the design, fabrication, installation and subsequent removal of the jacking system or systems.

The work includes restoration of disturbed surfaces to match existing conditions prior to the excavation.

The Contract Drawings show four (4) suggested jacking methods. Contract Drawings were developed under the following assumptions:

A. Jacking operations will be performed from existing abutment beam seats, from directly beneath the girder, where adequate space on the beam seat is available for jacking operations and associated bearing rehabilitation. This includes the following locations: Randolph Street Overpass East and West Abutments, Seventh Street Overpass East and West Abutments, Tenth Street

Overpass East and West Abutments, and the Eastbound over Passyunk Avenue Overpass North Abutment.

B. Jacking operations will be performed from jacking frames supported from the individual footings of column bent piers where existing underground utilities in the vicinity of the piers may be impacted by jacking from ground level. This includes the following locations: Seventh Street Overpass East Pier, Tenth Street Overpass East Pier, Westbound over Moyamensing Avenue Overpass Pier MW2.

C. Jacking operations will be performed from jacking columns/towers supported from the continuous footings of wall type abutments or piers where existing underground utilities in the vicinity of the substructure units may be impacted by jacking from ground level. This includes the following locations: Broad Street Overpass East Pier and West Abutment and Ramp K-L North Abutment.

D. Jacking operations will be performed from jacking columns/towers supported on steel grillages and timber matting at ground level where no underground utilities in the vicinity of the jacking operations exist or will be impacted by the jacking operations. This includes the following locations: Randolph Street Overpass East Pier, Broad Street Overpass East Abutment, Eastbound over Moyamensing Avenue Overpass East and West Abutment and Piers ME3 and ME6, Westbound over Moyamensing Avenue East Abutment, Eastbound over Passyunk Avenue Pier PE1, and Ramp M Pier RM4.

Contractor may propose for approval an alternate jacking scheme other than what is proposed in the Contract Drawings and described above. Any change should be at no additional cost to the Authority.

Approval of the working drawings does not relieve the Contractor of full responsibility for safety or adequacy of the method.

T.345.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.354 – BEARING REHABILITATION – TYPE 1
D. T.355 – BEARING REHABILITATION – TYPE 2
E. T.357 – BEARING REHABILITATION – TYPE 4
F. T.358 – BEARING REHABILITATION – TYPE 5
G. T.359 – BEARING REHABILITATION – TYPE 6
H. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

I. T.17 – SUBBASE 6” DEPTH (NO. 2A)
J. T.18 – SUBBASE 11” DEPTH (NO. 2A)
K. T.20 – CEMENT CONCRETE SIDEWALK, 4”DEPTH
L. T.25 – CLASS 1B EXCAVATION
M. T.28 – TOPSOIL, FURNISHED AND PLACED
N. T.39 – PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB – 4” CONCRETE CURB
O. T.40 – PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB – 8” CONCRETE CURB
P. T.92 – TYPE 31-S GUIDE RAIL

T.345.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT - Publication 408/2016-5, dated 10/05/2018. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    2. PennDOT – Publication 15M, Design manual Part 4, Appendix P, latest edition. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    3. AASHTO LRFD Bridge Construction Specifications 2nd Edition, including latest interim revisions.
    4. AASHTO LRFD Bridge Design Specifications 4th Edition, including latest interim revisions.
    5. AASHTO Guide Specifications for Bridge Temporary Works 1st Edition with 2008 Interims.
    6. American Society for Testing and Materials (ASTM) Specifications.
    7. American Welding Society - AWS D1.5 Bridge Welding Code, 2008 Edition with 2009 AASHTO Interims.
    8. AASHTO Standard Specifications for Highway Bridges, 17th Edition with Interims.

T.345.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Suggested methods of construction have been included in the Contract Drawings. The contractor shall submit a method of jacking for approval before the jacking operations begin. Do not order materials or begin work until the jacking scheme and materials are approved by the Engineer.
C. Submit design computations, drawings, and details of the proposed jacking

system sealed by a Professional Engineer licensed in the Commonwealth of Pennsylvania. As a minimum the following information is to be submitted:

1. Written narrative describing the jacking procedure and when work is to be performed. List the associated traffic control stage.
2. Erection scheme and detailed sequence of work coordinated with other related work items.
3. Sketches of all necessary components of the temporary jacking system, including the layout, geometry, size and capacity of the supports to be used. Include catalog cuts of any manufactured products which clearly state the capacity, strength, safe working load, allowable working stresses, etc., for that product or material.
4. Calculations performed by a Professional Engineer licensed in the Commonwealth of Pennsylvania showing that all components of the support system and false work are not overstressed and are stable for all combinations of loads. Show all assumptions, material specifications, and references clearly. Include calculations for foundations and design bearing pressures at base of false work towers, where applicable. Assume an allowable soil pressure of 1 ton per square foot unless a higher value can be justified.
5. Traffic stage during which the work will be performed.
6. Dead load and Live load reactions to bear on each jack.
7. Specification data for each jack, including size, capacity, number and positioning of jacking equipment.
8. Temporary cribbing and temporary support framing details required to support jacks.
9. Any modifications to bridge members required at the jacking positions so that the bridge members can sustain the jacking pressure.
10. Proposed jacking height.

T.345.2 MATERIALS

All materials shall conform to the standards necessary to implement the design. The specified materials are not to be considered approved until the jacking scheme is approved by the Engineer.

Jacks. Provide locknut cylinder type with at least 50% greater capacity than required.

T.345.3 CONSTRUCTION

T.345.3.1 JACKING OPERATIONS

Perform work in accordance with traffic staging indicated in the Traffic Control Plans. Lane closures of local roads will be required at some jacking locations.

Verify and locate all existing utilities prior to starting work. Conduct operations in a manner which ensures that the utilities will not be disturbed or endangered and assume full responsibility for any damage during construction.

For bridges with utilities, or with utilities in the vicinity of the jacking assemblies, coordinate all jacking work with the appropriate utilities.

Perform soft digging, as directed, to locate any underground pipes or utilities prior to any excavating for installation of jacking columns or other jacking support elements.

Excavate, as required, in accordance with PennDOT Publication 408/2016, Section 203 for Class 1B Excavations. Lay back (slope) excavations in accordance with OSHA regulations or provide temporary excavation support.

Management of any excavated material shall be in accordance with T.401 – HEALTH AND SAFETY PLAN, T.402 – WASTE MANAGEMENT PLAN, T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING and T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS.

Fill shall be in accordance with T.29 – FOREIGN BORROW EXCAVATION.

Topsoil shall be in accordance with T.28 – TOPOSOIL, FURNISHED AND PLACED.

Field verify conditions and dimensional requirements for each jacking point prior to fabrication of the jacking assembly.

Provide work platforms and protection shields, as required.

Fabricate steel jacking assemblies in accordance with PennDOT Publication 408/2016, Section 1105.

Temporarily loosen or remove bridge elements which may interfere or be damaged by movements associated with the jacking operations, including, but not limited to barrier steel sliding plates at expansion joints, conduits, and drainage pipes, by a means acceptable to the Engineer. Restore temporarily

loosened or removed elements upon completion of the jacking and associated repair work.

Use a pachometer to locate existing reinforcing steel in piers, as required. Locate holes and bolts to miss existing reinforcing steel.

Prior to jacking, be responsible for adequately bracing all work. The temporary jacking system should be properly braced in order to safely transmit all stresses imposed by the jacking operation. Install additional stiffeners, bearing plates, and any other additional components necessary for the jacking operation.

Jacking operations will not be permitted under live load. Associated repair work can be performed under live load, as indicated, once jacks are locked off and temporary supports are in place.

All jacks must be mechanically locked off in their final position with shims and blocking or other temporary support provided so the bridge is not supported by the jack.

During certain stages, traffic will be detoured off of Ramp K-L and Ramp M. Perform jacking and associated repair work on these structures during those stages.

Dead and live jacking loads have been provided in the Contract Drawings. These loads are approximate. Verify these loads prior to submitting the jacking plans.

Limit equipment, material or other construction loads on spans to be jacked or temporarily supported. A construction load has been included for the as-designed jacking scheme, as indicated in the plans.

Do not jack beams more than ¼ inch. The maximum differential lift between adjacent girders along a common bearing line shall be 1/8 inch.

Visually monitor the bridge and jacking support structures/assemblies for signs of structural distress during jacking and temporary support conditions. Monitor jacking forces with pressure gauges during jacking to ensure even lifting and that the forces do not exceed the jacking load values indicated in the plans. If forces reach the values indicated in the plans, or any structural distress is observed, cease jacking operations and notify the Engineer.

Coordinate jacking operations with all work potentially affected by jacking operations, including, but not limited to drainage modification and expansion joint repair work.

Repair any damage to the bridge due to the jacking operations, as directed by the Engineer, at no cost to the Authority.

Restore in-kind the existing ground/reconstruct existing pavement, curbs and/or sidewalks damaged by the jacking operations to match existing conditions prior to disturbance associated with the work. Perform restoration of existing ground, pavement, sidewalks, and curbs in accordance with Items T.12, T.13, T.15, T.16, T.17, T.18, T.20, T.28, T.39, T.40, and T.212.

END OF SECTION

T.354 – T.355 BEARING REHABILITATION – TYPE 1 & 2

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 354 BEARING REHABILITATION – TYPE 1
ITEM 355 BEARING REHABILITATION – TYPE 2

T.354.1 GENERAL

T.354.1.1 DESCRIPTION

This work consists of rehabilitating existing expansion bearing assemblies at the following bridges: Randolph Street Overpass, Seventh Street Overpass, Tenth Street Overpass, Broad Street Overpass, and Ramp K-L. The work includes all necessary fabrication, testing, erection, removal of the existing bearing assembly elements, as indicated, including steel bolster, bearing pad and masonry plate, removal and replacement of existing PTFE strips, installation of welded anchor bars, preparation of the bridge seat and installation of fill or beveled fill plates, as required, cleaning and painting of beam bottom flange and bearing assembly elements, cleaning of existing stainless steel surfaces, and reinstallation of the existing, rehabilitated bearing assembly onto existing anchor bolts with new plate washers and nuts. Each existing bearing assembly contains fill plate(s) (beveled or non-beveled) between bottom of girder flange and top of steel bolster, a steel bolster (beveled or non-beveled), a steel-reinforced elastomeric bearing pad, and a masonry plate with keeper plates. Stainless steel strips are bonded and seal welded to the keeper plates at the level of the bolster bottom flange and PTFE strips are bonded and recessed into the bolster flange.

ITEM 354 – Bearing Rehabilitation – Type 1:
Includes rehabilitation of the existing expansion bearing assemblies at the following locations: Randolph Street Overpass Abutments and East Pier, Seventh Street Overpass Abutments and East Pier, Tenth Street Overpass Abutments and East Pier, Broad Street Overpass West Abutment and East Pier, and Ramp K-L North Abutment. Includes bearing assembly rehabilitation including replacement of existing laminated elastomeric neoprene bearing pad with new laminated elastomeric neoprene bearing pad. See Contract Drawings for details and locations.

ITEM 355 – Bearing Rehabilitation – Type 2:
Includes rehabilitation of the existing expansion bearing assemblies at the following location: Broad Street Overpass East Abutment. Includes bearing assembly rehabilitation including replacement of existing laminated elastomeric neoprene bearing pad with new laminated elastomeric neoprene sliding bearing pad. See Contract Drawings for details and locations.

T.354.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.345 – JACKING BRIDGE SUPERSTRUCTURE – RANDOLPH STREET
D. T.346 – JACKING BRIDGE SUPERSTRUCTURE – SEVENTH STREET
E. T.347 – JACKING BRIDGE SUPERSTRUCTURE – TENTH STREET
F. T.348 – JACKING BRIDGE SUPERSTRUCTURE – BROAD STREET
G. T.349 – JACKING BRIDGE SUPERSTRUCTURE – RAMP K-L
H. T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
I. T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT
J. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.354.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT – Publication 15, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. PennDOT – Publication 35 (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
4. AASHTO LRFD Bridge Construction Specifications 2nd Edition, including latest interim revisions.
5. AASHTO LRFD Bridge Design Specifications 7th Edition, including latest interim revisions.
6. AASHTO Standard Specifications for Highway Bridges 17th Edition, including latest interim revisions.
7. AASHTO Guide Design Specifications for Bridge Temporary Works 1st Edition with 2008 Interims.
8. American Society for Testing and Materials (ASTM) Specifications.

T.354.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

B. Fabricators AISC Certification
C. Shop drawings shall be required for all bearings.

1. Shop drawings: Submit detailed shop drawings to the Engineer for review and acceptance. Shop drawings shall show detailed dimensional layout and support as well as details of materials of construction. Standard printed sheets containing information not applicable to this work are unacceptable as shop drawings. Do not commence fabrication until the shop drawings are approved. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawings reflect those conditions for proper fit.

2. Certified Test Reports: Submit certified copies of all test reports required by specifications. Test reports shall prove that all materials have been tested with required procedures and that the materials comply with all applicable requirements.

3. Manufacturer's Data: Furnish manufacturer's data sheets for certificates of compliance.

D. Bearing Rehabilitation Procedure. Submit a detailed bearing rehabilitation procedure with intermediate steps indicated and/or an alternative procedure to the Engineer for review and approval prior to performing any bearing rehabilitation work, fabricating new neoprene bearing pads, or developing bearing rehabilitation-related shop drawings. Do not begin bearing rehabilitation work without the written approval of the Engineer.
E. Field Measurements. Submit field measured dimensions to the Engineer for review and approval.
F. Painting. Submit a cleaning and painting plan to the Engineer for approval prior to beginning work. Painting will be done only after the completion of welding.

T.354.2 MATERIALS

A. Fabricated Structural Steel – PennDOT Publication 408/2016, Section 1105.02, AASHTO M270 (ASTM A709) Grade 50.

B. High Strength Bolts – Mechanically galvanized AASHTO M164 (ASTM A325) in accordance with PennDOT Publication 408/2016, Section 1105.02(d).

C. Nuts and Washers – PennDOT Publication 408/2016, Section 1105.02(c)2. Galvanize nuts and washers in accordance with PennDOT Publication 408/2016, Section 1105.02 (s).

D. Laminated Neoprene Bearing Pads – PennDOT Publication 408/2016, Section 1113.02 with 60 +/- 5 durometer elastomer, unless noted otherwise.

E. PTFE Sheet – PTFE (Polytetrafluoroethylene), dimpled, lubricated, made from virgin PTFE granular resin in accordance with PennDOT Publication 408/2016, Section 1111.02(c) and ASTM D4894.

F. PTFE Strip - PTFE (Polytetrafluoroethylene), dimpled, lubricated, made from virgin PTFE granular resin in accordance with PennDOT Publication 408/2016, Section 1111.02(c) and ASTM D4894.

G. Adhesive Material – PennDOT Publication 408/2016, Section 1111.02(c).

H. Bonding – In accordance with PennDOT Publication 408/2016, Section 1111.02(c).

I. Stainless Steel Sheet – PennDOT Publication 408/2016, Section 1111.02(c)

J. Stainless Steel Countersunk Screws – Per manufacturer recommendation.

K. Stainless Steel Tap Screws – Per manufacturer recommendation.

L. Paint.

   a. Existing Steel Surfaces – See T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES

   b. New Structureal Steel Surfaces – See PennDOT Publication 408/2016, Section 1060.

   c. Paint color: Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

T.354.2.1 FABRICATION

A. Fabricate the bearing pads in accordance with PennDOT Publication 408/2016, Section 1113.03. Test in accordance with with Section 1113.03 (f). The tested bearings shall not be installed on the bridge.

B. Bearing tolerances are per Publication 408/2016, Section 1113.03 (g).

C. Welding to be in accordance with ANSI/AASHTO/AWS D1.5 – 2008 Bridge Welding Code modified as specified in Publication 408/2016, Section 1105.03 (m) 1.

D. Fabricate structural steel in accordance with Publication 408/2016, Section 1105.03.

E. Fabricate PTFE sliding surfaces in accordance with Publication 408/2016, Section 1111.03(b).

F. Paint existing steel surfaces as specified in T.370.

G. Shop paint new steel surfaces in accordance with PennDOT Publication 408/2016, Section 1060.

T.354.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Verify all dimensions in the field required to satisfactorily complete the work prior to fabrication. Field measure and record all dimensions necessary for field verification and re-installation of the rehabilitated bearing assemblies at proper

locations and elevations. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawings reflect those conditions for proper fit. Revise affected details accordingly. Submit sketches clearly marked to indicate the revised revisions to the Engineer for review and approval. Do not proceed with fabrication until all revisions have been accepted. No additional compensatoin will be allowed for these revisions or for delays or problems as a result of these revisions.

Jack the bridge superstructure, lock off the jacks and provide necessary temporary supports.

Rehabilitate bearing assemblies and re-install as indicated in the Contract Drawings. Provide full and even bearing on all bearing planes.

Clean stainless steel sliding surfaces of all laitance, dirt, dust, or other foreign material.

The Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Prepare and coat existing steel surfaces in accordance with Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES. Do not paint PTFE or stainless steel sliding surfaces. Shop paint new steel in accordance with PennDOT Publication 408/2016, Section 1060.

Provide worker protection and environmental management in accordance with T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Repair any damage caused to existing bearing assemblies or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.356 BEARING REHABILITATION – TYPE 3

T.356.1 GENERAL

T.356.1.1 DESCRIPTION

This work consists of filling voids (depressions below beam seat level) in existing grout around anchor bolts with polymer modified or other approved cementitious mortar, as indicated or directed. The work includes surface preparation, application of an approved epoxy bonding compound, and installation of an approved mortar. See Contract Drawings for details and locations.

T.356.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.356.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT - Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT – Publication 35, (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.356.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.356.2 MATERIALS – From a manufacturer listed in PennDOT Publication 35 (Bulletin 15):

A. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.

B. Epoxy Bonding Compound – PennDOT Publication 408/2016, Section 706 and compatible with the mortar used:

Sikadur 32 Hi-Mod
Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071

Or Approved Equal

C. Polymer Modified and Special Cements, Mortars, and Concrete – PennDOT Publication 408/2016, Section MISC:

SikaTop 122 PLUS
Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071

Or Approved Equal

T.356.3 CONSTRUCTION

Perform work in accordance with the traffic staging indicated in the Traffic Control Plans.

Clean and coat corroded areas of exposed anchor bolts at repair locations with epoxy reinforcing bar patching material prior to placement of mortar.

Prepare surfaces and apply epoxy bonding compound in accordance with the manufacturer's recommendations.

Place and cure mortar in accordance with the manufacturer's recommendations.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Provide work platforms and protection shields, as required.

END OF SECTION

T.357 BEARING REHABILITATION – TYPE 4

T.357.1 GENERAL

T.357.1.1 DESCRIPTION

The work includes installing shim plates beneath existing elastomeric bearing pads to eliminate existing gaps, uneven or partial bearing conditions, as indicated. See Contract Drawings for details and locations.

T.357.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.350 – JACKING BRIDGE SUPERSTRUCTURE – RAMP M
D. T.351 – JACKING BRIDGE SUPERSTRUCTURE – EB OVER MOYAMENSING
E. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.357.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT – Publication 35, (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.357.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawings reflect those conditions for proper fit.
C. Submit manufacturer product data for materials to be used.
D. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.357.2 MATERIALS

A. Stainless Steel – PennDOT Publication 408/2016, Section 1105.02(a)3.g, Type 304

B. Epoxy Adhesive Compound (for adhering shim plate to bearing pad and concrete):

Sikadur 31 Hi-Mod Gel
Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071

Or Approved Equal

T.357.2.1 FABRICATION

A. Fabricate stainless steel in accordance with Publication 408/2016, Section 1105.03.

T.357.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Verify all dimensions in the field required for proper fit and to satisfactorily complete the work prior to submitting shop drawings.

Jack the bridge superstructure, lock off the jacks and provide necessary temporary supports.

Remove existing bearing pad.

Clean stainless steel sliding surfaces of all laitance, dirt, dust, or other foreign material.

Brush clean concrete bearing area.

Clean bearing pad surfaces of all laitance, dirt, dust, or other foreign material.

Apply epoxy adhesive compound in accordance with manufacturer's recommendations, and attach shim plate to bearing pad.

Apply epoxy adhesive compound to underside of shim plate and/or concrete bearing surface in accordance with manufacturer's recommendations, and reset bearing pad. Provide full and even bearing on all bearing planes.

Reset the bearing pad centered within the existing anchor bolt layout as indicated on the Reference Drawings.

Lower the bridge superstructure and remove jacks and temporary supports.

The Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.358 – T.359 BEARING REHABILITATION – TYPE 5 & 6

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 358 BEARING REHABILITATION – TYPE 5
ITEM 359 BEARING REHABILITATION – TYPE 6

T.358.1 GENERAL

T.358.1.1 DESCRIPTION

The work includes the resetting or replacing of existing sliding neoprene bearing pads, as indicated.

ITEM 358 – Bearing Rehabilitation – Type 5:
Includes removing and resetting existing sliding neoprene bearing pads. See Contract Drawings for details and locations.

ITEM 359 – Bearing Rehabilitation – Type 6:
Includes removing and replacing existing sliding neoprene bearing pads. See Contract Drawings for details and locations.

T.358.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.351 – JACKING BRIDGE SUPERSTRUCTURE – EB OVER MOYAMENSING
D. T.352 – JACKING BRIDGE SUPERSTRUCTURE – WB OVER MOYAMENSING
E. T.353 – JACKING BRIDGE SUPERSTRUCTURE – EB OVER PASSYUNK
F. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.358.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.
    1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

2. PennDOT – Publication 35, (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.358.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawings reflect those conditions for proper fit.

C. Submit manufacturer product data for materials to be used.

D. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.358.2 MATERIALS

A. Fabricated Structural Steel – PennDOT Publication 408/2016, Section 1105.02, AASHTO M270 (ASTM A709) Grade 50.

B. Neoprene Bearing Pads – PennDOT Publication 408/2016, Section 1113.02 with 50 +/- 5 durometer elastomer, unless noted otherwise.

C. PTFE Sheet – PTFE (Polytetrafluoroethylene), dimpled, lubricated, made from virgin PTFE granular resin in accordance with PennDOT Publication 408/2016, Section 1111.02(c) and ASTM D4894.

D. Stainless Steel Sheet – PennDOT Publication 408/2016, Section 1111.02(c)

E. Adhesive Material – PennDOT Publication 408/2016, Section 1111.02(c).

F. Epoxy Adhesive Compound (for adhering bearing pad to concrete):

Sikadur 31 Hi-Mod Gel
Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071

Or Approved Equal

T.358.2.1 FABRICATION

A. Fabricate the bearing pads in accordance with PennDOT Publication 408/2016, Section 1113.03. Test in accordance with with Section 1113.03 (f). The tested bearings shall not be installed on the bridge.

B. Bearing tolerances are per Publication 408/2007, Section 1113.03 (g).

C. Welding to be in accordance with ANSI/AASHTO/AWS D1.5 – 2008 Bridge Welding Code modified as specified in Publication 408/2016, Section 1105.03 (m) 1.

D. Fabricate PTFE sliding surfaces in accordance with Publication 408/2016, Section 1111.03(b).

T.358.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Verify all dimensions in the field required for proper fit and to satisfactorily complete the work prior to submitting shop drawings.

Jack the bridge superstructure, lock off the jacks and provide necessary temporary supports.

Remove existing bearing pad.

Clean stainless steel sliding surfaces of all laitance, dirt, dust, or other foreign material.

Brush clean concrete bearing area.

If resetting existing bearing pad, clean bearing pad surfaces of all laitance, dirt, dust, or other foreign material.

Apply epoxy adhesive compound to underside of bearing pad and/or concrete bearing surface in accordance with manufacturer's recommendations, and reset or replace bearing pad, as indicated. Provide full and even bearing on all bearing planes.

Install the bearing pad centered within the existing anchor bolt layout, as indicated on the Reference Drawings.

Lower the bridge superstructure and remove jacks and temporary supports.

Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.360 – T.361 BEARING REHABILITATION – TYPE 7 & 8

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 360 BEARING REHABILITATION – TYPE 7
ITEM 361 BEARING REHABILITATION – TYPE 8

T.360.1 GENERAL

T.360.1.1 DESCRIPTION

The work includes cutting and removing exposed portion of existing anchor bolts and installing new anchor bolts and keeper angles.

Resetting and replacing of the existing bearing pads is included in Item 358 – Bearing Rehabilitation – Type 5 and Item 359 – Bearing Rehabilitation – Type 6, respectively.

ITEM 360 – Bearing Rehabilitation – Type 7:
Includes cutting and removing existing anchor bolts and installing one (1) new keeper angle. Contract Drawings for details and locations.

ITEM 361 – Bearing Rehabilitation – Type 8:
Includes cutting and removing existing anchor bolts and installing two (2) new keeper angles. Contract Drawings for details and locations.

T.360.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.358 – BEARING REHABILITATION – TYPE 5
D. T.359 – BEARING REHABILITATION – TYPE 6
E. T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
F. T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT
G. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.360.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT – Publication 35, (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.360.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.

B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawings reflect those conditions for proper fit.

C. Submit manufacturer product data for materials to be used.

D. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

E. Painting. Submit a cleaning and painting plan to the Engineer for approval prior to beginning work. Painting will be done only after the completion of welding, if necessary.

T.360.2 MATERIALS

A. Fabricated Structural Steel – PennDOT Publication 408/2016, Section 1105.02, AASHTO M270 (ASTM A709) Grade 50.

B. Nuts and Washers – PennDOT Publication 408/2016, Section 1105.02(c)2. Galvanize nuts and washers in accordance with PennDOT Publication 408/2016, Section 1105.02 (s).

C. Adhesive Anchor Bolts – Hilti-Epoxy Adhesive Anchor System HIT-RE 500 with HAS-Super rods or PennDOT Publication 35 (Bulletin 15) approved equal.

D. Epoxy Adhesive (for adhesive anchor bolts) – In accordance with adhesive anchor bolt manufacturer's recommendations.

E. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.

F. Paint.

   a. Existing Steel Surfaces – See T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES

   b. New Structural Steel Surfaces – See PennDOT Publication 408/2016, Section 1060.

   c. Paint color: Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

T.360.2.1 FABRICATION

A. Fabricate structural steel in accordance with Publication 408/2016, Section 1105.03.

B. Paint existing steel surfaces as specified in T.370.

C. Shop paint new steel surfaces in accordance with PennDOT Publication 408/2016, Section 1060.

T.360.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Verify all dimensions in the field required for proper fit and to satisfactorily complete the work prior to submitting shop drawings.

Cut off existing anchor bolts and grind flush with existing concrete. Paint exposed steel from cut off anchor bolts with epoxy reinforcing bar patching material.

Prepare and coat existing steel sufaces, as indicated, in accordance with T.370. Do not paint PTFE or stainless steel surfaces. Shop paint new steel in accordance with PennDOT Publication 408/2016, Section 1060.

Provide worker protection and environmental management in accordance with T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

The Contractor is responsible for locating existing reinforcing bars prior to drilling dowel holes for new anchors. Adjust anchor locations as required to avoid existing reinforcing bars. Any damage to existing concrete or reinforcing bars will be repaired by the Contractor at no cost to the Authority.

Sawcut and remove a portion of concrete from the top surface of the pier cap to the level of the top mat of reinforcing bars adjacent to bearings being rehabilitated to locate reinforcing bars for core drilling holes for new anchor bolts.

Mechanically clean and coat with epoxy reinforcing bar patching material any exposed reinforcing steel which is to remain.

Core drill anchor bolt holes. Blow clean cored holes with compressed air to remove dirt, dust and water prior to anchor bolt installation. Install adhesive anchor bolts in accordance with manufacturer's recommendations.

Install keeper angles. Install adhesive anchors in accordance with manuafacturer's recommendations.

Repair/patch the sawcut and removed portion of concrete in the top surface of the pier cap using the appropriate concrete repair type. Duplicate all existing details, such as chamfers, joints, etc.

Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.362 BEARING REHABILITATION – TYPE 9

T.362.1 GENERAL

T.362.1.1 DESCRIPTION

The work includes cutting and removing an existing anchor bolt. See Contract Drawings for locations.

T.362.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.362.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.
    1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.362.2 MATERIALS –

A. Epoxy Reinforcing Bar Patching Material – PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.

T.362.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Cut off existing anchor bolt and grind flush with existing concrete. Paint exposed steel from cut off anchor bolts with epoxy reinforcing steel patching material.

Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.363 BEARING REHABILITATION – TYPE 10

T.363.1 GENERAL

T.363.1.1 DESCRIPTION

The work includes replacing missing anchor bolt nuts and washers. See Contract Drawings for locations.

T.363.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.363.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.
    1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT – Publication 35 (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.363.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawigs reflect those conditions for proper fit.

T.363.2 MATERIALS

A. Nuts and Washers – PennDOT Publication 408/2016, Section 1105.02(c)2. Galvanize nuts and washers in accordance with PennDOT Publication 408/2016, Section 1105.02 (s).
B. Lubricant – PennDOT Publication 408/2016, Section 1105.02.

T.363.2.1 FABRICATION

A. Fabricate structural steel in accordance with Publication 408/2016, Section 1105.03.

T.363.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Verify all dimensions in the field required for proper fit and to satisfactorily complete the work prior to submitting shop drawings.

Clean the anchor bolt and surrounding area to remove rust and debris. Lubricate anchor bolt threads and install a new galvanized nuts and washers.

Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.364 BEARING REHABILITATION – TYPE 11

T.364.1 GENERAL

T.364.1.1 DESCRIPTION

The work includes removing an existing loose anchor bolt and installing a new adhesive anchor bolt. See Contract drawings for locations.

T.364.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.364.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.
    1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT – Publication 35 (Bulletin 15). References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.364.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved. Provide a statement on the shop drawings that the Contractor has verified the existing conditions and the shop drawings reflect those conditions for proper fit.
C. Submit manufacturer product data for materials to be used.
D. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.364.2 MATERIALS

A. Adhesive Anchor Bolts – Hilti-Epoxy Adhesive Anchor System HIT-RE 500 with HAS-Super rods or PennDOT Publication 35 (Bulletin 15) approved equal.

B. Nuts and Washers – PennDOT Publication 408/2016, Section 1105.02(c)2. Galvanize nuts and washers in accordance with PennDOT Publication 408/2016, Section 1105.02 (s).

C. Epoxy Adhesive (for adhesive anchor bolts) – In accordance with adhesive anchor bolt manufacturer's recommendations.

T.364.2.1 FABRICATION

A. Fabricate structural steel in accordance with Publication 408/2016, Section 1105.03. Fabricate anchor bolt length to accommodate placement in existing anchor bolt hole.

T.364.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 1056.3, 1050.3, and as follows:

Verify all dimensions in the field required for proper fit and to satisfactorily complete the work prior to submitting shop drawings.

Remove existing anchor bolt.

Blow clean existing hole with compressed air to remove dirt, dust and water prior to anchor bolt installation.

Install adhesive anchor bolts in accordance with manufacturer's recommendations.

Contractor shall be responsible for removal and disposal of all demolished materials not being reinstalled as part of this work.

Repair any damage caused to existing bearing assembly or other bridge elements as a result of bearing rehabilitation operations to the satisfaction of the Engineer at no cost to the Authority.

Perform work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.365 SPECIAL MORTAR REPAIRS

T.365.1 GENERAL

T.365.1.1 DESCRIPTION: This work is overhead surface repairs of areas of deteriorated concrete with trowel-placed, or form and pump/form and pour, non-shrink polymer mortar with or without formwork as indicated or directed by the Engineer. This work applies to repair of the underside of deck and concrete infill between beams at the CSX Railroad Overpass.

T.365.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS
D. T.399 – CSX COORDINATION

T.365.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.365.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.365.2 MATERIALS

A. Mortar – Use one of the following PennDOT Publication 35 (Bulletin 15) approved polymer modified special cement mortars specifically designated for vertical and overhead surface repair:

Duraltop Gel
Euclid Chemical Company
19215 Redwood Road
Cleveland, OH 44110

HD 25 VO
Dayton Superior Corporation
1125 Byers Road
Miamisburg, OH 45342

FastSet Repair Mortar
The QUIKCRETE Companies
4 Concourse Parkway, Suite 1900
Atlanta, GA 30328

Or Approved Equal.

Certify as specified in Section 106.03(b)3.

B. Epoxy Bonding Compound – PennDOT Publication 408/2016, Sections 706.1 and 1040.3(e)1.

C. Reinforcement Bars, Epoxy Coated – PennDOT Publication 408/2016, Section 1002.2.

D. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.

T.365.3 CONSTRUCTION

T.365.3.1 GENERAL

Perform work in accordance with the traffic staging indicated in the Traffic Control Plans.

Perform work in accordance with Item 399 – CSX COORDINATION. Conduct operations so as not to interfere with, interrupt, or endanger the operation of trains or damage, destroy, or endanger the integrity of railroad facilities.

T.365.3.2 INSPECTION AND MARK OUT

The Contractor shall sound all exposed concrete surfaces over the entire underside of deck and exposed concrete infill between beams, and mark out areas of delamination, spalls and reinforcement with insufficient cover.

The limits of spall repair shall be verified, measured and approved by the Engineer prior to the Contractor starting repair work.

Contractor to provide the equipment and labor for the Authority's representatives to access the marked-out areas.

T.365.3.2. REMOVAL OF DETERIORATED CONCRETE

Sawcut around the perimeter of each deteriorated area to neat, straight lines within the defined limits. Minimum depth of repair is 1/2 inch; maximum depth of repair is 2 inches, or per manufacturer's recommendations.

Exercise care so as not to damage existing structural steel. Submit a plan/procedure for protecting existing structural steel from damage during sawcutting operations to the Engineer for review and approval prior to starting work.

Notify the Engineer immediately if repair operations cause any damage to the existing structural steel.

Remove all unsound, damaged, porous, or deteriorated concrete to sound concrete or as directed. If reinforcement bars are exposed, continue removal until at least ¾ of the bar circumference is exposed. If unsound concrete is encountered at or below the mid-depth of the reinforcement bar, extend removal to provide a minimum of one (1) inch clearance around all reinforcement bars, regardless of concrete deterioration, or to sound concrete, whichever is deeper. Do not damage any steel bar or its bond in surrounding concrete.

Abrasive blast concrete surfaces within the deteriorated areas to remove partially loosened concrete chips and all foreign material. Abrasive blast exposed reinforcement bars to remove rust and/or corrosion to a SSPC-SP6. Replace any bars damaged during removal operations, as required and directed. Protect existing structural steel from damage during abrasive blasting operations.

All existing reinforcement bars to be retained shall be coated with an epoxy reinforcement bar patching material.

Power driven hand tools for removal of deteriorated concrete are required and are limited to the following restrictions.

Do not use pneumatic hammers heavier than nominal 30 pound class.

Do not operate pneumatic hammers or mechanical chipping tools at an angle in excess of 45 degrees relative to the concrete surface.

Triple-headed tampers fitted with star drills not less than two inches in diameter in the tamper sockets are permitted in the vertical position.

Do not use chisel points.

Use hand tools such as hammers and chisels, or small air chisels to remove fine particles of unsound concrete or to provide necessary clearances around reinforcement bars.

Provide work platforms and shielding, as required.

Satisfactory dispose of all concrete rubble and debris as indicated and directed.

Be responsible for the structural stability and integrity of the structure.

Satisfactorily repair any damages to the structure beyond the limits of this work due to construction operations as directed and at no expense to the Authority.

T.365.3.3 PATCHING

Blow clean all removal areas with oil free compressed air and protect against any contaminate detrimental to the bond of the new patching material.

Prepare surfaces in accordance with manufacturer’s recommendations.

Mix, apply, finish, and cure the repair mortar in accordance with manufacturer's instructions. Provide a finished surface which is the same elevation, contour, and texture as the adjacent areas.

Obtain train schedules and coordinate patching operations with train schedules to prevent the application, curing or bonding of the repair mortar, per manufacturer’s recommendations, from being compromised by train passage and associated vibrations.

Have manufacturer's technical representative present during the initial phase of application to instruct the work force with the correct method of preparation, application, and curing.

Duplicate all existing details, such as chamfers, joints, etc.

Provide cool and cold weather curing protection in accordance with applicable parts of PennDOT Publication 408/2016, Section 1001.3(p).

END OF SECTION

T.366 REMOVE GRAFFITI

T.366.1 GENERAL

T.366.1.1 DESCRIPTION: This work is the removal of graffiti from existing concrete structures. Graffiti is to be removed as indicated or as directed.

T.366.1.2 RELATED SECTIONS

A. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
B. T.321 – APPLICATION OF ANTI-GRAFFITI COATING
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.366.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.366.2 MATERIALS - Submit material to be used to the Engineer for approval. Provide a narrative stating the method and sequence of operation to be used for graffiti removal.

T.366.3 CONSTRUCTION

Perform removal in a test area to demonstrate the removal method. The Engineer must approve the removal method before it is implemented on remaining areas. The test area will define the amount of removal required to consider the area clean.

It is understood that graffiti on the structures is ongoing and will even continue during construction. Areas for removal will be directed by the Engineer.

Repair any damage caused to the structure by the removal operations to the satisfaction of the Engineer and at no cost to the Authority.

Perform work in accordance with the staging shown in the Traffic Control Plans.

END OF SECTION

T.367 FILL DRAINAGE PIPE WITH CONCRETE

T.367.1 GENERAL

T.367.1.1 DESCRIPTION: This work is plugging and filling of existing (abandoned) drainage pipes within the substructure units with concrete, as indicated. This work applies to the west pier of the Seventh Street Overpass and Piers ME1 and ME6 of the Eastbound over Moyamensing Overpass.

T.367.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.340 – MODIFY DRAINAGE SYSTEM
D. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.367.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.367.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit a plan for filling the existing drainage pipes with concrete to the Engineer for review and approval.

T.367.2 MATERIALS

A. Class A Cement Concrete – PennDOT Publication 408/2016, Section 704.
B. Plug – Type to be submitted to the Engineer for review and approve.

T.367.3 CONSTRUCTION

T.367.3.1 GENERAL

Perform work in accordance with the staging indicated on the Traffic Control Plans.

Provide work platforms and protection shields, as required.

T.367. 3.2 PLUGGING AND FILLING EXISTING DRAINAGE PIPE WITH CONCRETE

Plug and fill the existing drainage pipe with concrete, as indicated or directed.

It is unknown whether or not the existing, abandoned drainage pipes to be filled with concrete are capped or still attached to the existing sewer system. Plug and fill the existing drainage pipes in such a manner that prevents concrete from entering the existing sewer system.

END OF SECTION

T.368 REPAIR BARRIER SLIDING PLATE CONNECTION SCREWS

T.368.1 GENERAL

T.368.1.1 DESCRIPTION: This work is the replacement of missing and tightening of loose connection screws at barrier steel sliding plates at expansion dams, as indicated.

T.368.1.2 RELATED SECTIONS

A. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
B. T.326 – REPLACE NEOPRENE STRIP SEAL GLAND
C. T.327 – REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS
D. T.328 – REPLACE NEOPRENE STRIP SEAL EXPANSION DAM
E. T.329 – REPLACE TOOTH EXPANSION DAM JOINT WITH MODULAR EXPANSION JOINT

T.368.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. PennDOT Standard Drawing BC-767M

T.368.2 MATERIALS

A. Screws and Inserts - PennDOT Standard Drawing BC-767M.

T.368.3 CONSTRUCTION – In accordance with Standard Drawing BC-767M and as follows:

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

END OF SECTION

T.369 JOINT SEALING, SOUND BARRIERS

T.369.1 GENERAL

T.369.1.1 DESCRIPTION: This work is the cleaning, removal and replacement of loose, missing or deteriorated pre-compressed joint sealing material at joints between sound barrier panels, from top of panel to bottom of anchor beam, as directed. Work includes removal and disposal of existing joint sealing material, and placement of joint sealant or caulking compound in accordance with the manufacturer's recommendations.

T.369.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.369.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.369.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
C. Submit repair procedure, including surface preparation, to the Engineer for review and approval.

T.369.2 MATERIALS – From a manufacturer listed in PennDOT Publication 35 (Bulletin 15):

A. Joint Backing Material, PennDOT Publication 408/2016, Section 705.9 and compatible with the joint sealant used.

B. Joint Sealant, PennDOT Publication 408/2016, Section 705.4(a) or Caulking Compound, PennDOT Publication 408/2016, Section 705.8(b).

T.369.3 CONSTRUCTION

This work applies only to existing joints exhibiting loose, missing or deteriorated joint sealing material, as directed. It does not apply to all wall panel joints.

The Contractor shall mark out locations and limits of loose, missing or deteriorated joint sealing material.

The locations/limits of repair shall be verified, measured and approved by the Engineer prior to the Contractor starting repair work.

Verify all dimensions in the field necessary to satisfactorily complete work prior to ordering material or starting the joint sealing work. Measure existing joint openings and order seals appropriately sized for the anticipated joint opening.

Remove and satisfactorily dispose of existing joint sealing material and all other debris resulting from the work.

Clean the joint opening and prepare existing surfaces in accordance with the manufacturer's recommendations.

Place joint seal in accordance with the manufacturer's recommendations.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans.

Provide work platforms and protection shields, as required.

END OF SECTION

T.370 SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES

T.370.1 GENERAL

T.370.1.1 DESCRIPTION

A. The scope of work for this project will consist of four cases:

1. Cleaning and painting existing galvanized sign structures S-2, S-23 and S-24: Existing galvanized steel surfaces will be cleaned with pressurized water to WJ-4 cleanliness (SSPC-SP WJ-4 – Light Cleaning, "Waterjet Cleaning of Metals"). Supplemental power tool cleaning of damaged galvanizing or rusting areas will be required. A full coat of penetrating sealer, spot coat of epoxy and full coat of urethane finish will be applied.

2. Cleaning and painting of bridge steel at expansion joint replacement locations: Existing steel surfaces that will be accessible and in contact with new concrete within the blockouts at expansion joint locations will be power tool cleaned to bare metal in accordance with SSPC-SP 15 (Commercial Grade Power Tool Cleaning). The steel surfaces will receive one coat of epoxy zinc primer while accessible.

3. Cleaning and painting of rehabilitated bridge bearings of five (5) bridges at Randolph Street, Seventh Street, Tenth Street, Broad Street and Ramp K-L: Existing steel surfaces of bridge bearing assemblies such as masonry plates, bolsters and underside of girder flanges will be power tool cleaned to bare metal in accordance with SSPC-SP 15. The steel surfaces not in contact with bearing pad surfaces will be coated with a 3-coat organic zinc system consisting of an epoxy zinc primer, epoxy intermediate coat and urethane finish. The steel surfaces to be in contact with bearing pad surfaces will be coated with primer.

4. Cleaning and painting of rehabilitated bridge bearings (limited) at Westbound over Moyamensing Avenue Overpass. Existing steel consisting of bolster edges only of bridge bearing assemblies, as indicated, will be power tool cleaned to bare metal in accordance with SSPC-SP 15. The steel surfaces will be coated with a 3-coat zinc system consisting of an organic zinc primer, epoxy intermediate coat and urethane finish.

B. The work will require constructing a containment meeting SSPC-Guide 6 Class 3P requirements and power tool cleaning utilizing vacuum-shrouded power tools in accordance with SSPC-SP 15 (Commercial Grade Power Tool Cleaning). The

existing coatings contain lead, chromium and other hazardous metals. Adhere to the contract documents regarding handling, transportation, and disposal of hazardous waste debris and all other related debris with this contract.

C. Galvanized conduit and other aluminum or galvanized appurtenances are not included in this scope of work. Various electrical cables, power lines, conduits, junction boxes, and electrical units may be present throughout the work area. These items shall not be used to suspend, hang, or otherwise support scaffolding, rigging, or other items. These items shall be fully protected and shielded from cleaning activities, painting and containment construction work activities.

D. All work activities are permitted only during the times indicated in the Specifications. Adhere to the contract documents for quality assurance procedures during surface preparation and coating application; and for maintenance and protection of traffic requirements during the performance of all work.

T.370.1.2 RELATED SECTIONS

A. T.2 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.327 – REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS
D. T.328 – REPLACE NEOPRENE STRIP SEAL EXPANSION DAM
E. T.329 – REPLACE TOOTH EXPANSION JOINT WITH NEW MODULAR EXPANSION JOINT
F. T.354 – BEARING REHABILITATION – TYPE 1
G. T.355 – BEARING REHABILITATION – TYPE 2
H. T.360 – BEARING REHABILITATION – TYPE 7
I. T.361 – BEARING REHABILITATION – TYPE 8
J. T.392 – STEEL SIGN STRUCTURE REPAIR, S-2
K. T.392 – STEEL SIGN STRUCTURE REPAIR, S-23
L. T.392 – STEEL SIGN STRUCTURE REPAIR, S-24
M. T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANANAGEMENT
N. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.370.2 MATERIALS

T.370.2.01 PROTECTIVE COVERINGS AND CONTAINMENT

A. Supply all equipment and materials needed to contain all over spray, paint spills, drips, and deposition of coating material to surfaces not intended to receive them. This may include, but is not limited to: ground covers, rigging, scaffolding, planking,

containment screens or tarpaulin materials. Observe applicable containment requirements of Section T.371 of these specifications.

B. The CONTRACTOR is fully responsible for any damage caused to surrounding property. At the CONTRACTOR's option, car covers can be provided for vehicles within the likely dispersion zone of inadvertent releases of surface preparation dust/debris or paint spills/overspray.

T.370.2.02 CONTAINMENT DURING COATING APPLICATION

A. Unless approved by the Engineer in writing, apply the coatings in accordance with the applicable containment requirements of Section T.371 of these specifications.

T.370.2.03 EQUIPMENT

A. Provide all equipment necessary to perform the work including necessary power supplies, even if the required equipment is not specifically designated in this Section.

T.370.2.04 COATING MATERIALS

A. Provide the type and quantity of coating materials required to paint all surfaces as identified in the scope of work. Verify that all coating materials are VOC compliant with regard to the regulations of both Pennsylvania and New Jersey.

B. Use the same manufacturer for all coats of the approved system, including thinners, additives, and touch-up coatings. Do not co-mix coating products or components produced by different manufacturers under any circumstances.

C. Only use paint materials that are packaged in sealed, original, labeled containers bearing the manufacturers name, type of material, brand name, color designation, shelf life, date of manufacture, batch number, and instructions for mixing and thinning.

D. An epoxy zinc/epoxy/urethane system listed in a coating system from NEPCOAT Qualified Products List B is specified for use in areas that are power tool cleaned in accordance with SSPC-SP 15 and designated to receive the full 3-coat organic zinc system. NEPCOAT is the Northeast Protective Coatings Committee. NEPCOAT systems have been tested under the National Transportation Product Evaluation Program (NTPEP) and meet specific performance acceptance criteria established by NEPCOAT. The following are additional requirements of the coating system.

1. Zinc-Rich Primer – This material shall be an organic, zinc-rich material, with a minimum of 77 – 85 % zinc dust in the dried film. Epoxy materials shall be

used. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted. Material shall conform to SSPC Paint Specification, No. 20.

2. Primer Stripe Coat – To be applied before or after the application of the prime coat to all edges, crevices, welds, rivets, and bolt threads/nuts. This material shall be the same as the primer coat. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.

3. Intermediate Coat – A full intermediate coat of an epoxy material. Lead and chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.

4. Final Stripe Coat - A stripe coat of the urethane finish coat applied prior to the application of the full finish coat. The stripe coat is to be applied to all edges, crevices, welds, bolt threads and rivets (this stripe coat is applied to the same surfaces as the primer stripe coat). The material shall be the same as the final coat. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.

5. Finish Coat – A full aliphatic acrylic urethane finish coat. The total coating binder solids for two component urethane coating shall be made of at least 17% polyisocyanate (NCO) by weight. A minimum of 1% of a hindered amine light stabilizer shall be included in the formulations. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted. The color of the finish coat shall be selected and approved by DRPA to match the existing finish color. The existing finish color was defined as Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223. A sample of the finish coat material in the required color and gloss shall be submitted to the ENGINEER for approval prior to application.

6. The highest quality raw materials shall be used for the manufacturing of each batch of each coat in order to maximize corrosion protection and to minimize fading, chalking, and color drift. Corrosion protection, color and gloss stability, and the overall long-term aesthetics of the paint system are of critical importance to this project. Color shift after 5 years shall not be greater than 2 Delta E (ASTM D2244).

7. The dry film thickness (DFT) for each coat of the system is indicated in Table 1 below. The total system DFT with the exception of the stripe coat areas,

and individual spot readings, is not to exceed 15 mils. SSPC-PA 2 (Level 3) allows spot readings of 80% to 120% of the specified DFT of 9 to 15 mils. The total average for a given measured area must be within the specified range.

TABLE 1. DRY FILM THICKNESS

Coat	**DFT Range (mils)**
Primer	3 to 5
Primer Stripe coat	2 to 4
Intermediate Coat	4 to 6
Finish Stripe Coat	1 to 2
Finish Coat	2 to 4
Total System DFT (Including stripe coats)	9 to 15 (12 to 21)

E. For existing steel surfaces at expansion joint replacement locations prepared in accordance with SSPC-SP 15, and designated to receive one coat of primer, the epoxy zinc primer from the NEPCOAT List B system selected for use shall be used.

F. For existing galvanized steel surfaces designated for preparation and coating, a full penetrating sealer/spot epoxy/full urethane coating system shall be used. The epoxy and urethane coatings shall be from the NEPCOAT List B system selected for use. The CONTRACTOR shall provide the proposed penetrating sealer, along with a letter of acceptability and compatibility from the coating manufacturer for written approval in advance of the work.

G. All materials must be approved by the Engineer in writing prior to application of the material. The CONTRACTOR may propose a substitute material of equivalent or better quality for the Engineer's review and approval, provided the system meets all the acceptance criteria requirements established by NEPCOAT. The evaluation of any or all substitute materials as equivalent or better quality shall be at the sole discretion of the Engineer. In the event of a conflict, the minimum requirements presented in this Section shall prevail. Coating manufacturers are required to provide test data for each coat as identified in Section T.370.2.04.H.2 for review and acceptance prior to the use of any material.

H. The Authority reserves the right to test the coating materials at any time, and any number of times during the period of field painting. The Engineer will sample the paint(s) being used.

1. Unopened containers of each component of the paints at the construction site shall be selected for the analysis. At the discretion of the Engineer, in lieu of complete kits of material, representative pints or quarts can be transferred to metal containers, identified, sealed, and certified in the presence of the CONTRACTOR.

2. The manufacturer is required to submit a color sample of the finish and the following parameters for their products before the work begins, and is required to provide the specific test results obtained for each batch of material shipped to the project. The Authority may conduct any or all of the following tests to evaluate the material upon receipt on site or at any time during the coating process. Material which does not comply with the parameters provided originally and/or the batch test results provided by the manufacturer will be rejected and can not be used. The Authority also reserves the right to conduct any other testing deemed necessary to evaluate the quality of the paint materials.

    a. Drying Time to Touch @ 70°F to 77°F, ASTM D1640

    b. Viscosity (Stormer @ 25°C, KU), ASTM D562

    c. % Total Solids by Weight, ASTM D2369

    d. Volatile Organic Compound (VOC), ASTM D3960

    e. Weight per Gallon, ASTM D1475

    f. Volume Nonvolatile Matter, ASTM D2697

    g. Pigment Content, ASTM D2371

    h. % Metallic Zinc in Primer by Differential Scanning Calorimetry

    i. Infrared Identification - of individual components and of the mixed coating for 2 component materials. For the individual components, obtain each spectrum by sandwiching a small quantity (i.e., 1 to 2 drops) of material between two potassium bromide plates and obtaining a transmission infrared spectrum. For the mixed and cured material, use a potassium bromide pellet technique.

T.370.3 CONSTRUCTION

T.370.3.01 SURFACE PREPARATION

A. Best engineering practices are to be used to prevent paint chips, dust, sediment, or any other debris from contaminating the environment. Remove all bird litter prior to cleaning in accordance with a Histoplasmosis Plan developed by the CONTRACTOR. Material removed must be contained and disposed of properly. Failure to contain and dispose of material or debris is cause for the Authority to suspend work until corrective actions are taken to allow work to resume in accordance with the specifications. No additional time or payment allowance will be made for such suspension of work.

B. CHLORIDE REMEDIATION

1. Develop surface preparation procedures and processes that will remove chloride from the surfaces in addition to removing the paint, rust, and mill scale.

2. Methods of chloride removal may include, but are not limited to: steam cleaning or pressure washing and scrubbing, the use of proprietary chloride removal chemicals provided their use is approved by the coating manufacturer, abrasive blast cleaning the steel and allowing it to rust overnight followed by re-blasting, blast cleaning with blends of fine and coarse abrasives, or wet abrasive blast cleaning. Provide the proposed procedures for chloride remediation in the Surface preparation/painting plan in accordance with E.24 Submittals.

3. Upon completion of the surface preparation, test surfaces for chlorides in accordance with the Class A retrieval methods (cell or sleeve) of SSPC-Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and other Nonporous Substrates." Frequency of tests will be determined by the Engineer. Test representative surfaces which were previously rusted (i.e. pitted steel) for the presence of remaining chlorides.

4. If chlorides are detected at levels greater than 7µg/cm2, continue to clean the affected areas until acceptable results are achieved.

5. Following chloride testing of less than 7µg/cm2, abrasive blast and/or power tool clean the surfaces, as applicable, to achieve the required surface preparation criteria.

C. COMPRESSED AIR CLEANLINESS

1. When compressed air is required for any operation, only use compressed air that is free from moisture and oil contamination.

2. Verify the cleanliness of the compressed air by the white blotter test in accordance with ASTM D4285 at least once per shift for each compressor system. Sufficient freedom from oil and moisture is confirmed if soiling or discoloration are not visible on the paper.

3. If air contamination is evident, change filters, clean traps, add moisture separators or filters, or make adjustments as necessary to achieve clean, dry air.

D. COMMERCIAL GRADE POWER TOOL CLEANING TO SSPC-SP 15

1. For all surfaces designated to be cleaned using vacuum-shrouded power tools in accordance with SSPC-SP 15, "Commercial Grade Power Tool Cleaning," remove oil, grease and surface debris in accordance with SSPC-SP 1 prior to mechanical cleaning.

2. Power tool clean the entire surface in accordance with SSPC-SP 15 to remove all existing coatings, mill scale, rust and other debris. Slight residues of rust and paint may be left in the bottoms of pits if the original surface is pitted. Use vacuum shrouded power tools such as rotary impact tools, needle guns, or other profile producing tools.

3. SSPC-VIS 3 may be used as an aid in defining the appearance of the steel after preparation

4. The surface profile is to be as recommended by the manufacturer and in no case less than 1 mil, as field measured with replica tape or by other methods.

E. PRESSURIZED WATER CLEANING OF GALVANIZED SURFACES

1. Thoroughly clean all galvanized steel surfaces included in the work with clean, potable, pressurized water. Remove all loose galvanizing, loose rust and all other debris in accordance with SSPC-SP WJ-4 – Light Cleaning, "Waterjet Cleaning of Metals."

2. Supplemental cleaning using vacuum shrouded power tools, as described in Section T.370.3.01.F, will be necessary where galvanized steel is damaged, deteriorated or rusting.

3. Verify that surfaces to be painted are thoroughly dry prior to painting. Pay particular attention to areas such as seams, joints, etc., where moisture may collect or take longer to dry.

F. SUPPLEMENTAL POWER TOOL CLEANING OF GALVANIZED SURFACES

1. Further prepare any areas of loose, damaged, deteriorated or rusting galvanizing by power tool cleaning in accordance with SSPC-SP 3, “Power Tool Cleaning,” using vacuum shrouded power tools.

2. Verify that any material that remains is tight and intact by probing with a putty knife in accordance with the requirements of SSPC-SP 3.

3. Use hand tool cleaning for surface preparation only upon approval of the Engineer.

G. AMBIENT CONDITIONS

1. Unless otherwise allowed by the Engineer, do not conduct final surface preparation which exposes the substrate under damp environmental conditions or when the surface temperature is less than 5°F greater than the dew point temperature of the surrounding air.

T.370.3.02 PAINT APPLICATION

A. PAINT STORAGE, MIXING AND HANDLING

1. Keep all containers of paint unopened until required for use.

2. Store all paint, thinners, and solvents in accordance with OSHA regulations and the requirements of the paint manufacturer. Store the paint and solvents under cover, out of direct sunlight. Maintain the temperature between 40°F and 90°F, unless the requirements of the manufacturer are more restrictive. The CONTRACTOR shall provide the paint and solvent storage plan, including proposed storage locations, to the Engineer for approval prior to use.

3. Provide the size and number of fire extinguishers in proper proportion to the quantity of paint stored.

4. Do not permit smoking within 200 feet of paint storage, mixing, and application areas.

5. Do not open or mix paints in the storage area unless authorized by the Engineer.

6. Do not return mixed paints to the storage area.

7. Bulk containers for solvents and thinners must be equipped with spring loaded, self closing, dispensing nozzles. Use Underwriter's Laboratories approved containers for transporting paint to mixing areas.

8. Use explosion proof lighting fixtures.

9. Do not permit the accumulation of empty paint cans, combustibles, and other debris.

10. Maintain Material Safety Data Sheets (MSDS) sheets for all materials.

B. MIXING AND THINNING OF COATING MATERIALS

1. Verify that the paint to be mixed has not exceeded its shelf life.

2. Utilize proper ventilation in the mixing area to prevent injury to workmen or the accumulation of volatile gases.

3. Mix all coatings in accordance with the requirements of the coating manufacturer. Use mechanical equipment such as a Jiffy mixer unless prohibited by the manufacturer.

4. Thin paints in strict accordance with the coating manufacturer’s written instructions. Use only those types, brands, and amounts of thinner recommended by the coating manufacturer. Limit the thinning to the minimum amount necessary to facilitate application.

5. Mix only complete kits of multiple component coating materials.

C. COATING APPLICATION

1. Surface Preparation – Verify that the surface exhibits the specified degree of cleaning immediately prior to painting. Apply the primer to exposed steel surfaces within 8 hours of completing surface preparation and on the same day as completing surface preparation, following all other requirements of this section. If the surface has degraded prior to paint application, re-clean the surface.

2. Grease/Oil – If grease or oil have become deposited on the bare substrate or on the surface of any of the applied coats, remove by solvent cleaning in accordance with SSPC-SP 1 prior to the application of the next coat.

    a. Only use solvents that will not damage the substrate and that are acceptable to the coating manufacturer and the Engineer.

    b. Collect and properly dispose of all residue.

    c. Use clean cloths for the final wiping.

3. Surface Cleanliness – Thoroughly clean the surface prior to the application of the primer to remove dirt, dust, and other deleterious material.

4. Ambient Conditions – Apply coatings under the following conditions. Maintain the conditions until the coating is dried sufficiently to resist exposure to temperatures, humidity, and moisture outside of the specified conditions. If the requirements of the coating manufacturer are more restrictive or permit otherwise, advise the Engineer in writing and comply with the limitations established by the written approval of the Engineer.

    a. Surface and Air Temperatures – Between 40°F and 110°F.

    b. Relative Humidity – Less than 85%.

    c. Dew Point – Surface temperature at least 5°F above the dew point temperature of the surrounding air.

    d. Frost/Rain – Do not apply coatings to surfaces containing frost or during rain, fog, or similar conditions.

    e. Remove and replace any coating that is exposed to unacceptable conditions (e.g. rain or dew) prior to adequate curing.

5. Methods of Application and Containment – Apply all coats by brush, roller, or spray according to the manufacturer's recommendations. Conduct all spray application to minimize overspray. Immediately halt all spray operations if overspray is observed escaping the work area. Do not resume spray application until the cause of the problem is corrected. When using brush or roller application, install sufficient containment materials and drop cloths to collect all drips and spills.

6. Coverage, Continuity and Stripe Coating

a. Apply each coat to assure thorough wetting of the substrate or underlying coat, and to achieve a smooth, streamline surface relatively free of discontinuities. Shadow through, pinholes, bubbles, skips, misses, lap marks between applications, variations in color or texture, or other visible discontinuities in any coat are unacceptable. Runs or sags may be brushed out while the material remains wet.

b. Thoroughly coat all surfaces with special attention to hard-to-reach areas and irregular surfaces such as edges, corners, welds, crevices and bolts/rivets.

c. For areas designated to receive the 3-coat organic zinc system, verify that stripe coats are applied to increase coating thickness and coverage in these areas as follows.

- Apply a primer stripe coat before or after the application of the full prime coat. Apply the stripe coat to all edges, welds, bolt threads/nuts, rivets, and crevices. If the stripe coat is applied prior to the full primer coat, allow the stripe coat to stand for a minimum of 10 minutes prior to overcoating it with the full prime coat, unless a longer time is required by the coating manufacturer. The purpose is to provide inspection personnel with the opportunity to visually verify that a stripe coat has been applied as specified prior to covering it up with the full prime coat. If the primer stripe coat is applied after the full prime coat has been applied, allow the full prime coat to cure sufficiently before applying the stripe coat.

- Apply the intermediate coat after the primer and primer stripe coat have dried for overcoating in accordance with the manufacturer's instructions. Apply a stripe coat of the finish coat to all edges, welds, crevices, bolt threads/nuts, and rivets prior to the application of the full urethane finish coat. Allow the stripe coat to stand for a minimum of 10 minutes prior to overcoating it with the full finish coat unless a longer time is required by the coating manufacturer.

7. Coating Adhesion – If there is poor adhesion to the substrate, remove the coating in the affected area and reapply the material.

8. Wet Film Thickness – Use wet film thickness gages in accordance with ASTM D4414 to verify the thickness of each coat at the time of application.

9. Dry Film Thickness

    a. Apply the primer to the thickness specified in T.370.2.04.D.7, Table 1, or according to manufacturer's recommendations as approved by the Engineer.

    b. Measure the thickness of the primer applied to ferrous substrates using nondestructive magnetic dry film thickness gages. Comply with SSPC PA 2 for the calibration and use of the gages, and the frequency of thickness measurements.

    c. If there are questions regarding the thickness of the applied coating or there are disputes regarding the non destructive measurements of coating thickness on metal substrates, a Tooke Gage (destructive film thickness gage) may be used when authorized by the Engineer. Conduct measurements in accordance with ASTM D4138, but limit its use to a minimum of locations. Mark and repair all damage created by the destructive testing.

    d. Apply additional coating in areas of insufficient thickness with care to assure that all repairs blend in with the surrounding material. Unless directed otherwise by the Engineer, remove excessive coating thickness and reapply the affected coat(s).

D. REPAIR OF DAMAGE TO COMPLETED COATING SYSTEM

1. Localized Damage – Prepare localized damage by solvent cleaning in accordance with SSPC-SP 1 followed by power tool cleaning:

    a. If the damage exposes the substrate, remove all loose material in accordance with SSPC-SP 15, and re-apply all required coatings.

    b. If the substrate is not exposed, clean in accordance with SSPC-SP 3. Use SSPC-SP 2 for surface preparation only upon approval of the Engineer. Re-apply all required coatings.

    c. SSPC-VIS 3 may be used as an aid in defining the appearance of the steel after preparation.

2. Extensive Damage – Repair extensive damage to the coating by methods as directed by the Engineer.

3. Containment and Rigging Marks – Following removal of containment, prepare all damage, misses, or areas caused by the scaffolding, containment walls, and rigging marks and apply the affected coats.

T.370.3.03 HOUSEKEEPING

A. GENERAL

1. Conduct housekeeping daily to maintain the work site in a neat and orderly condition, and surrounding property (parking lots, pedestrian walkways, roadways, etc.) free of project debris (e.g., surface preparation and paint debris, materials of construction, etc.).

2. At the end of each day at a minimum, haul empty paint cans and other debris to the approved waste storage area.

3. Promptly remove all paint drips, splashes, and over spray from surfaces not intended to be painted.

4. Upon project completion, remove all equipment and materials, correct any damage caused by the operation, and leave all surfaces in a clean and acceptable condition.

T.370.3.04 INSPECTION

A. CONTRACTOR'S INSPECTION

1. Furnish, until final acceptance of the coating system, all equipment and instrumentation needed to inspect all phases of the work.

2. Conduct and document the following minimum Quality Control inspections on a daily basis. Provide copies of all records to the Engineer weekly, or more frequently, if directed.

    a. General Project Information – project name, contractor name, superintendent or foreman, inspector, and date.

    b. Work location(s).

    c. Protective Coverings – coverings and containment in place, surrounding property free of project debris.

    d. Ambient Conditions – test results and test locations during surface preparation and painting.

e. Compressed Air Cleanliness – time and location of tests.

f. Surface Preparation – method(s) of preparation, equipment used, surfaces prepared, and quality of preparation (i.e., surface cleanliness and surface profile). Include copies of test tape with reports.

g. Soluble Salts or Chlorides – method(s) of remediation and test results.

h. Coating Material and Thinner – product trade names and batch numbers mixed each day.

i. Coating Mixing Data – quantities mixed, method(s) of mixing, mixing times, thinner amounts.

j. Application Data – locations coated, method(s) of application, equipment used, application times, dry times between coats, cleanliness between coats.

k. Coating Thickness – existing thickness, newly applied thickness (wet and dry), testing equipment used, frequency and location of measurements.

l. Appearance and Film Continuity - continuity and appearance (runs, sags, pinholes).

B. ENGINEER'S QUALITY ASSURANCE INSPECTION

1. The Engineer will provide Quality Assurance inspections to verify that any or all phases of the Work are in accordance with the requirements of this Section. Facilitate this inspection as required, including allowing ample time for the inspections and access to the work. Quality Assurance hold point inspections include, but are not limited to, surface preparation, pre painting cleanliness, application of each coat including stripe coats, dry film thickness of each coat and total film thickness, film appearance and continuity.

2. No work will commence on a particular item until the requirements of the inspection hold points have been met for all preceding tasks and approved by the Engineer.

3. The presence or activity of Engineer Quality Assurance inspections in no way relieves the CONTRACTOR of the responsibility to comply with all provisions of this Section and to provide complete Quality Control inspections of its own.

END OF SECTION

T.371 WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT

T.371.1 GENERAL

T.371.1.1 PURPOSE

The specifications in this Section outline requirements for environmental protection, workers safety, and management of waste generated on site in association with the removal, disturbance and disposal of coatings with potential to contain lead and other toxic metals from the structures along the Walt Whitman Bridge Corridor – Pennsylvania Approach. It is the Contractor's responsibility to take into consideration the work specified in this section and to safeguard the environment and workers, as well as the public who may be affected as the result of project activities.

The contractor is to assume all existing coatings which will be disturbed during the course of this contract contains lead and other heavy metals, as determined by the required testing, unless the Contractor has received prior written approval from the Engineer stating otherwise.

T.371.1.2 GENERAL DESCRIPTION

A. Work under this section consists of designing and implementing an Environmental Compliance Program (ECP), Workers Protection Program (WPP), Waste Management Plan (WMP), and Emergency Response Plan (ERP).

B. The Contractor's plans and programs shall be submitted to the Engineer for review of conformance with the project specifications. Review of these plans by the Engineer does not relieve the Contractor of the responsibility for maintaining compliance with the plans and programs, applicable local, state and/or federal regulations, or the requirements of the Contract Documents and Specifications. The protection and compliance programs submitted by the Contractor shall also conform to the latest version of the "DRPA Safety Administrative Manual (SAM)". In the event of conflict between the requirements of this specification and the DRPA SAM, or any other governing body having jurisdictions over this Contract, comply with the most stringent requirements.

C. All preconstruction submittals under this Section are to be submitted to the Engineer for review and approval a minimum of 20 days prior to mobilization at the project site. The Contractor shall not begin any construction related work until the Engineer has accepted the submittals.

D. The Contractor is to assume all existing coatings which will be disturbed during the course of this contract contains lead and therefore is classified as

lead hazardous waste despite any testing that may prove otherwise. All abrasive material used for the removal of the coating as well as any material cross contaminated with paint chips will also be considered as lead hazardous waste despite any tests that may prove otherwise.

E. For the repair of existing steel where existing lead base paint is disturbed by operations such as torch cutting, grinding, rivet/bolt removal, or similar work; it is necessary to remove all visible paint from the substrate for a minimum distance of four (4) inches on all sides of the area where work may disturb or affect the paint.

F. The requirements of the New Jersey Lead Hazard Evaluation and Abatement Code (NJAC 5:17) are in effect for this project. Among the requirements of this code are firm's supervisor and worker certification in Commercial Buildings and Superstructures per NJAC 8:62, and notification of the Department of Labor 10 days prior to start-up. Provide the Engineer with a copy of the certification and the notification.

T.371.1.3 PRE-CONSTRUCTION SUBMITTALS

Acceptance of the programs and plans does not relieve the Contractor from performing the work in accordance with the requirements of federal, state, and local laws and regulations or any other standards and guidelines governing this project and its activities. The responsibility for the application and completeness of the programs and work practices rest solely with the Contractor.

A. Programs and Plans

Provide five (5) copies of the following Compliance Programs for the Engineer's review and approval. These Plans must be provided and signed by a Certified Industrial Hygienist:

1- Environmental Compliance Plan (ECP)
2- Workers Protection Plan (WPP)
3- Waste Management Plan (WMP)
4- Emergency Response Plan (ERP)

1. Environmental Compliance Plan - The purpose of this plan is to prevent and control visible emissions and breaches of contaminants into the environment. A written program for conducting observations, inspection and corrective actions and to report, remediate, and record incidents and conditions must be included in this Plan.

2. Worker Protection Plan – The WPP must provide protection to the workers in accordance with applicable OSHA regulation and industrial hygiene practices. Training programs, personal exposure monitoring, respiratory protection, and hazard communication as well as any other

applicable regulations such as confined space, and energy control programs must be included in the Plan. The Plan must be site specific, addressing and emphasizing those regulations and practices that are specific to this contract such as working on elevated structures and exposure to heavy metal contaminants.

3. Waste Management Plan – As part of the Environmental Compliance Plan, a written WMP is to be included outlining waste classifications, generation, processing and storage on site. Means of testing and preparations for the offsite transportation and disposal by qualified contractors must be included in this plan. Workers' relevant training and site inspection for the handling of waste must also be included.

4. Emergency Response Plan – An ERP outlining actions and procedures in the event of spills, accidents, and emergencies, and releases of contaminants into the soil or water.

B. Project Staff and Training Submittals

1. Contractor is to provide the name, title, qualifications and relevant experience of those who are responsible for the management and implementation of the Project's Compliance Plans to the Engineer for review and approval.

2. A certified Industrial Hygienist is to review all workers' blood lead results and provide proper report outlining his/her evaluations and necessary interventions as provided by the provisions of this document. Provide the name, experience and qualifications of the Industrial Hygienist who will be reviewing and approving the site specific Workers Protection Plan and who will be overseeing the development of the Compliance Programs mentioned above.

3. Provide the credentials and the name of the Competent Person who shall oversee the day to day operations in relation to the implementations of the Contractor's workers protection and environmental activities on site. The Competent Person must have successfully completed the SSPC C-3 training with refresher training completed within the past 12 months, must have 30 hours OSHA training within the last 2 years, and have at least 3 years of field related experience with elevated steel structures involving lead abatement and paint removal operations.

4. Prior to start of work on site, Contractor is to submit at the minimum the following workers training documentations and certifications for the review and approval of the Engineer

    - Lead awareness training
    - Medical clearance for the use of respirators

- Respiratory fit test certifications
- Initial blood testing for lead and ZPP
- Site specific fall protection training
- Contractors Health and Safety review training
- Emergency response notification and procedure review
- Training on proper handling of the hazardous waste on site

C. Laboratory Qualification and Submittals

Provide documentations that the laboratories providing environmental services are certified by American Industrial Hygiene Associations (AIHA) and accredited for environmental lead samples under the National Lead Laboratory Accreditation Program (NLLAP), as well as any other necessary credentials for the processing of the analytical samples for the appropriate category (ex. air, soil, wipe, water).

The laboratory for the blood testing and analysis must be approved by OSHA. A current list of approved labs may be obtained from OSHA's web site.

T.371.1.4 CONTRACTOR CHAIN OF COMMAND

A contact list with the names, title, and contact information must be provide and updated as necessary.

T.371.1.5 DISCIPLINARY ACTION AND CONTRACTOR EMPLOYEES UNSAFE ACT

Disciplinary procedures for unsafe acts shall be in accordance with Section 3, "Organization, Administration and Responsibilities", in the DRPA Owner Controlled Insurance Program, Administrative Safety Guide.

T.371.1.6 REFERENCE STANDARDS

The Contractor is to comply with the requirements of this Section and all applicable Federal, State and local regulations and codes including but not limited to the regulations of the United State Environmental Protection Agency (USEPA) and Occupational Safety and Health Administration (OSHA), and State of New Jersey and Commonwealth of Pennsylvania Departments of Environmental Protection (DEP).

Latest Edition – The most recent version of the following acts, regulations, guides and standards form a part of this document. In the event of a conflict, the Contractor is to comply with the most stringent requirements, including any new or revised regulations or codes that may take effect after the contract award date. A copy of all relevant and applicable reference standards must be maintained and available on site in a hard copy or digital format.

American Industrial Hygiene Associations (AIHA)
American Conference of Governmental Industrial Hygienists (ACGIH)
29 CFR 1910 - Occupational Safety and Health Regulation for General Industry
29 CFR 1926 – Occupational Safety and Health Regulation for the Construction Industry
40 CFR 50 – National Primary and Secondary Ambient Air Quality Standards
40 CFR 58 – Ambient Air Quality Surveillance
40 CFR 60 – App A, Method 22, Visual Determination of Fugitive Emissions from Material Source and Smoke Emission from Fires
40 CFR 261, Appendix II, Toxicity Characteristic Leaching Procedure
40 CFE 262, Standards Applicable to Generators of Hazardous Waste
40 CFR 263, Standards Applicable to Transporters of Hazardous Waste
40 CFR 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265, Subpart C, Preparedness and Prevention
40 CFR 265 Subpart D, Contingency Plan and Emergency Procedures
40 CFR 265.16, Personnel Training
40 CFR 268, Land Disposal Restrictions
40 CFR 302, Designation, Reportable Quantities and Notification
40 CFR 355, Emergency Planning and Notification
49 CFR 171-179, Hazardous Material Regulations
The Society for Protective Coating (SSPC)
SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Operations
SSPC Guide 7, Guide for the Disposal of Lead Contaminated Surface Preparation Debris
Guide 12, Guide for Illumination of Industrial Painting Projects
Guide 16, Guide to Specifying and Selecting Dust Collectors
SSPC 93-02, Industrial Lead Paint Removal Volume I
SSPC 95-06, Project Design, Industrial Lead Paint Removal Handbook, Volume II
SSPC-TU 7, Conducting Ambient Air, Soil, and Water Sampling During Surface Preparation and Paint Disturbance Activities
QP-1 Standard Procedure for Evaluating the Qualifications of Painting Contactors
QP-2 Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint
Pennsylvania-Environmental Protection - Title 25
New Jersey Administrative Code - Title 7

T.371.2 PRODUCTS

T.371.2.1 CONTAINMENT MATERIALS AND EQUIPMENT

A. Contractor is to supply all materials and equipment needed to contain paint removal debris, for the protection of the environment, traveling public, working personnel of the Contractor, the DRPA personnel and their representatives, and other Contractors or individuals utilizing the Walt Whitman Bridge Corridor – Pennsylvania Approach. This may include but is not limited to, ground covers, platforms, scaffolding, tarpaulins, dust collection units, ventilation units, HEPA vacuums, spill kits, boats, and other containment material.

B. All material and equipment provided must be free of loose dust and debris at the time of entry to the site and when removed from the site unless classified as hazardous waste. When necessary, any material or equipment that has come in contact with lead paint, directly or indirectly, must comply with this section for the testing and disposal of material prior to disposal or removal from the site.

C. All equipment supplied must be properly maintained to meet any noise control ordinance applicable to this project.

D. The containment systems for the purpose of removal or disturbance of existing paint on the steel or other sections of the bridge structures will be in accordance with SSPC-Guide 6 containment Class and these specifications unless otherwise noted by the Engineer's written permission.

E. The Contractor shall take all measures necessary to prevent the releases of waste material generated by the cleaning and painting operations during working or non working periods and during assembly, disassembly and moving of work platforms and containment materials or the handling of wastes.

F. If the ground beneath the containment serves as the containment floor, the ground shall be covered with air and water impermeable tarp or rigid material that is sealed at joints to prevent hazardous waste or waste water to exit the containment floor and prevent rain water or ground water to enter the containment through the floor.

G. Unless otherwise approved by the Engineer, ground under the containment must be covered with tarps for a minimum distance of 10 feet beyond the vertical walls of the containment in all directions to capture inadvertent releases or spills of waste, dust, water, solvents, or paint being used inside the containment or on the platforms.

H. All waste material inside the containment or on the platform must be cleaned by the end of the work shift. Accumulation of hazardous waste material in excess of allowable work load or in case of foreseeable adverse weather forecast where a breach in the containment may occur is not permitted.

I. Protect storm drains from debris or paint entering the system.

T.371.2.2 CONTAINMENT DESIGN

A. The work platform and containment system shall be designed by a professional structural engineer registered in the State of New Jersey and Commonwealth of Pennsylvania who is in the employment or is a subcontractor to the Contractor. The Contractor shall collect all necessary field data and perform all required field measurements necessary to complete the design, construction, relocation, and removal of the platform and the containment systems. The contractor shall submit a detailed plan of the platform and the containment system and shall receive written approval by the Engineer prior to the installation.

B. Containment drawing plans are necessary when the size of the containment requires load calculations, when the drawing is a necessary component of a safety evaluation, or when the movement of waste in the containment (ex. ventilation system or collection of runoff water) requires pre-planning and approval. The detailed working drawings for the containment system must at a minimum include a plan elevation, and cross section of the containment enclosure in relation to the bridge structure and lane height reduction. All Class A containments require containment drawings and Engineer's approval prior to construction.

C. After the installation of the platform and/or the containment, the Contractor's engineer responsible for the design, or a designated employee by the same firm working under the direction of the design engineer, must conduct a site visit to verify that the containment and/or the platform are built as per approved signed and sealed drawings. The design engineer must submit a letter to the Engineer confirming this inspection prior to any paint removal work or relocation of any equipment for the performance of the paint removal or rehabilitation work.

D. Any field changes to the original approved drawings affecting structural or functional integrity of the containment or platform will only be accepted after the submission and acceptance of supplemental calculations or design drawings.

E. The appropriate design live load for the platform shall be selected by the

Contractor and meet the minimum requirements of the Contract documents and Specifications.

F. All platforms and work stage scaffolds shall have sides protected by handrails and guardrails. Lifelines and body harness will not be utilized as a primary fall protection.

G. Identify the means to control runoff water off the platform and work area when designing a platform or containment system. Drainage pipe ends shall not terminate into active work areas.

H. The Contractor shall include the design for opening or removal of containments when wind speeds are expected to exceed the containment wind Load/speed limits. A fail safe components for wind speeds in excess of the designed wind speed such as automatic breakout panels that provide for appropriate safe opening and safe retention of containment parts are to be provided when necessary.

I. All material utilized in containment construction shall be fire-retardant. All applicable federal, state and local agency laws, regulations, standards and codes in addition to acceptable fire rating standards such as passing U.L and NFPA test standards must be provided.

J. Contractor must have staff available during work and off work hours to attend to the site for emergency maintenance of the containments and platforms as needed.

T.371.2.3 CONTAINMENT COMPONENTS

All containment utilized in the process of paint removal operations must adhere to SSPC Guide 6 for compliance with the type of containment material and structural design as applicable by the said guidelines.

The basic components that make up containment systems are defined below.

1. Rigidity of Containment Materials
2. Permeability of Containment Materials
3. Support Structure
4. Containment Joints
5. Entryway
6. Mechanical Ventilation
7. Negative Pressure
8. Exhaust Ventilation

T.371.2.4 TYPE OF CONTAINMENT

A. Sealing of the containment enclosure walls and floor for the purpose of containing

waste or runoff water must comply with SSPC Guide 6 for:

1. Abrasive Blast Cleaning - Table A
2. Water Blasting/Water Jetting - Table W
3. Chemical Stripping – Table C
4. Power Tool Cleaning – Table P

B. For the purpose of this Specification, any water jetting or washing of structural steel in excess of 5000 psi where lead base paint is present will require the collection and treatment of the runoff water unless otherwise noted by the Engineer's written approval.

C. If pressure washing or rinsing of the steel or other painted surfaces of the structure, with water pressure equal or less than 5000 psi, dislodges paint or other debris, all such material dislodged by the water must be collected. Proper mesh size must be employed to capture this material. Mesh containment material that capture paint chips and debris while allowing the water to pass through shall have openings a maximum of 25 mils (625 microns) in greatest dimension. Discharge of any solid debris to the water way or land below is prohibited.

D. When using chemical strippers, the Contractor is to use SSPC Class 3C containment in accordance to SSPC Guide 6 and other provisions of this Specification.

E. When Hand Tool Cleaning is used as the paint removal method of choice, the contractor shall use proper coverage to assure capturing all fugitive paint chips and cleanup debris within the contained area.

F. When Power Tool Cleaning is used as the paint removal method of choice, the Contractor shall use power tools equipped with HEPA vacuum shrouds within SSPC class 3P containment or higher Class P containment in accordance to SSPC Guide 6 and other provisions of this Specification.

G. If Abrasive blasting is allowed, in connection with paint removal or surface preparation, the Contractor shall use Class 1A containment in accordance to SSPC Guide 6 and other provisions of this Specification

T.371.3 EXECUTION

T.371.3.1 VISIBLE EMISSION AND RELEASES TO AIR, SOIL AND WATER

T.371.3.1.1 Visible Emissions and Inspection

Contractor shall monitor visible emission on all lead disturbing activities including paint removal activities, containment installation or dismantling, and the operation of lead paint processing equipments.

The Contractor's Competent Person shall immediately shut down the dust producing operation and direct the Contractor to undertake corrective actions to control emission if any visible dust is observed.

T.371.3.2 REGULATED AREA MONITORING AND TESTING

T.371.3.2.1 Regulated Area Air Monitoring Equipment (Low Flow Personal Pumps)

A. Contractor is to perform regulated area air monitoring to ensure that his operations are in compliance with the criteria described within this section, along with the Construction Contract Documents. The purpose of this monitoring is for the protection of Contractor's workers, DRPA workers, and the public from exposure to airborne lead dust as well as other contaminants when necessary.

B. The Contractor must use low flow pumps to collect area air samples. At least two readings at each location for a minimum of 7 hours each are necessary to establish acceptable readings. All data must be reported as 8 hours time weighted average (TWA).

C. The positioning of the low flow monitors will be based on logistics in the area of need to evaluate exposure to the Contractor's workers, DRPA personnel and the public.. Contractor is to establish hazard zones around construction equipment and activities that have the potential to generate airborne emissions of lead, chromium, and other toxic contaminants. The purpose and the activities subject to monitoring must be outlined in the Contractor's Worker Protection Plan. Once the regulated areas are defined, the area must be visibly marked by ropes or other means to prevent unauthorized entry into the area. Signs in accordance with the provisions of this section must be provided.

D. The boundaries for the demarcation of the regulated area must be based on the action levels for the target contaminants. If the monitoring indicates emissions in excess of the Permissible Exposure Limits (PEL), Contractor is to modify the operation of the containment and the equipment so as to reduce emissions within the PEL, and repeat the monitoring.

E. Once the regulated areas have been established and accepted by the Engineer, unless there are changes in the work condition or equipment there is no need for additional monitoring. However periodic monitoring as part of a quality control program must be scheduled within 6 months of the initial monitoring or sooner if requested by the Engineer.

F. If requested by the Engineer, the Contractor shall provide two (2) low flow personal pumps for use by the Engineer's representative.

T.371.3.2.2 Criteria for Regulated Area Air Monitoring

The intent of the regulated area air monitoring is to establish a safe zone around any operation or equipment that has the potential to produce contaminants that adversely affect the health and safety of the workers. The regulated area monitoring may also be extended to cover those operations and equipment with potential to expose public, DRPA personnel, and other trades working on site to lead and dust. Contractor shall perform regulated area air monitoring as described in this section. The results of the regulated area monitoring will be compared to the OSHA's established Action Level (AL) and Permissible Exposure Limits (PEL) standards for the target heavy metal. For those contaminants where Action Levels are not established, the results shall be compared to ½ the Permissible Exposure Limit (PEL) as referenced in this document.

T.371.3.3 WASTE MANAGEMENT PLAN

A. Any evidence of improper storage and handling of hazardous waste will be cause for immediate suspension of all waste generating work until corrective actions are to the satisfaction of the Engineer.

B. The Contractor is to ensure the proper collection of waste materials during generation, processing and storage.

C. The Contractor's Competent Person must inspect the waste storage area daily and document all findings from these inspections in his daily log.

D. A weekly summary report of the hazardous waste management and inspection activities must be compiled by the Competent Person and submitted to the Engineer if requested.

T.371.3.3.1 Waste Testing

A. The contractor shall collect and analyze samples of all waste water in accordance with the disposal facility's specifications or in accordance with the federal, state or local laws, regulations, characteristics and specifications to determine methods of disposal. The Contractor shall confirm the appropriate classifications of waste with disposal facility and notify the Engineers in writing prior to offsite disposal.

B. Contractor's reporting of waste sampling, analysis, and waste characterization as well as disposal facilities acceptance must be included in a pre-disposal submittal to the Engineer in support of the Contractor's claim.

C. Laboratory analysis, chain-of-custody, and disposal facilities' acceptance letter must be included in the pre-disposal claims.

D. The competent person shall oversee the collection of TCLP samples, when applicable, to ensure they are collected by the Contractor in accordance with EPA Regulation 40 CFR 261, Appendix 11, Method 1311. Composite waste samples shall be randomly collected for TCLP analysis from waste drums stored by Contractor. TCLP sample analysis must be received and reviewed by the Engineer or his representative prior to waste disposal. Contractor shall ensure that hazardous and non-hazardous wastes are not co-mingled and are stored separately. Once waste classification has been determined, the Contractor shall apply proper labeling to the waste drums, in accordance with EPA and DOT regulations 40 CFR 262.34 and 49 CFR 172.304, respectively..

E. A different sampling procedure for the confirmation of waste classification by TCLP analysis method for abrasive blast waste may be requested by the Engineer. In that case additional samples for TCLP may be required. The Contractor must comply with this request at no additional cost.

F. Sampling Frequency – If the generation of sampled waste remains constant, additional testing will not be required unless required by the federal, state, or local laws and regulations or the disposal facility. If the nature of the previously sampled waste changes due to cross contamination, change in generation process, or if evident by presence of excess waste on non-hazardous debris, additional sampling must be performed by the Contractor or at the request of the Engineer. The waste stream may also be established for the disposal of containment and other construction materials such as tarps, wood furring, spent sealer material, spent spray foam, cleanup debris contaminated with lead base paint, etc.

T.371.3.3.2 Laboratory Approval and Reporting

A. Prior to using any laboratory services, the Contractor shall submit contact information as well as accreditations and certifications for his laboratory of choice. For the laboratories performing environmental services, the Contractor must provide laboratory's accreditation for metals analysis by the American Industrial Hygiene Associations (AIHA) and accreditation for environmental lead samples under the National Lead Laboratory Accreditation Program (NLLAP). The Contractor shall have all laboratory results submitted with original copies including lab reports and chain of custodies to the Engineer. The original laboratory results shall be reported to the Engineer as soon as they are received by the Contractor and no later than 10 days after the representative samples were collected. Chain-of-custody forms for the test samples collected must be enclosed in the laboratory reports submitted to the Engineer. Contractor must provide faster sample turn-around-time if requested by the Engineer.

B. The reports shall include at a minimum:

1. The number of samples collected
2. The date samples collected
3. Laboratory analytical method
4. Identity of the waste stream(s) analyzed
5. The sampler's information
6. Chain of custody form(s)
7. An interpretation of test results

T.371.3.3.3 Waste Manifesting and Handling

A. The Delaware River Port Authority and the Contractor are the co-generators of the hazardous waste. The Authority will provide an EPA identification number but the Contractor is responsible for the cost, operation, and management of waste as described in this Section.

B. All hazardous waste manifests shall be signed by the DRPA's designated representatives.

C. Comply with 40 CFR 262, NJAC Title 7, (as applicable), and PA Title 25, Chapter 260-270 regulations for the on-site handling and storage of all hazardous waste generated by the project activities.

D. Comply with PA Title 25, Chapter 273, 277 and 278 regulations as applicable for the on-site handling and storage of all residual waste generated by the project activities.

E. The Contractor is responsible in ensuring that all waste transfer/transport activities follow the proper procedures. Only DOT approved drums must be utilized to store waste and that they are in good condition, with no signs of rust or corrosion. The containers shall not be overfilled and must have secured lid and closed except during waste transfer.

F. When the waste is picked-up by the transporter, the Contractor is to ensure that only a licensed waste transporter with valid documentation will transport the waste off site. All waste manifests must be properly completed in accordance with EPA Regulation 40 CFR 262, 268, and any other mandated state and local regulations.

T.371.3.3.4 Hazardous Waste Containers and Storage of Waste

A. Contractor shall not store hazardous waste on-site for longer than 60 days.

Contractor may apply for a longer accumulation time which may be allowed by written permission from the Engineer. In that case, under no circumstances, accumulations of hazardous waste on site shall exceed more than 90 days from the first day of the original accumulation date.

B. All hazardous waste must be placed in a secured storage area with proper warning signs “Hazardous Waste” posted.

C. The hazardous waste containers shall not be placed directly on the ground and an impermeable ground cover must be provided beneath the containers where waste is stored.

D. Mixing of hazardous and non hazardous waste is prohibited.

E. All containers on site must be labeled appropriately and be in good condition. All provisions of the applicable codes for containers placement, clearance, and labeling must be followed.

F. When there is potential for hazardous waste to be exposed to the elements or subject to runoff, the Contractor must take immediate corrective actions to resolve the condition to the satisfaction of the Engineer. Lack of response or inadequate corrective action may result in Engineer decision to stop all waste generating operations until such time that the situation is resolved.

G. Reasonable efforts by the Contractor must be made to assure that all containers of waste on site are inaccessible to public.

H. Hazardous waste - All hazardous waste must be stored on DRPA property until removed to an off-site disposal facility. All containers prior to use must be in DOT approved condition, free of any non compatible contaminants, and have no damages. Use containers that are resistant to rust and corrosion, painted if constructed of steel, and that can be secured with locking lids and covers that will seal out the elements. Use of tarp, plywood, or other such material as a mean to provide cover on the containers is not an acceptable practice. Assure that dry volume capacity of the hazardous waste containers are clearly marked on all containers, and that they are labeled as required by the specifications of this Contract.

I. Waste Water – All waste water generated on site and subject to collection must be collected and tested prior to disposal. Water used for hygiene practices such as decon, hand wash, or laundry facilities must be collected and filtered through multistage filtrating system to 5 microns or greater. Initial and periodic testing must be performed to confirm the efficiency of the filtration to the established level for proper disposal. Discharge of any waste water into any sewer system shall be with pre-approval of the local authorities subject to testing and a written confirmation by the Authority that such waste can be

discharged as claimed. A letter of approval by the Public Owned Treatment Works (POTW) must be provided by the Contractor to the Engineer before discharging any water into the system.

J. Construction Waste – All containers for non-hazardous construction debris must be free of loose debris when brought to the site. Non hazardous waste shall not be stored in the same un-segregated area as the hazardous waste. Unsafe accumulation of construction waste is prohibited.

K. Scrap Steel Containers – The Contractor is to provide appropriate equipment for the handling, storage, and transportation of scrap steel.

L. Spent Solvent and Flammable Waste –

1. Spent solvent must be stored in an area clearly marked as fire hazards. Do not mix solvent or flammable waste with spent abrasive, paint debris, water, or other waste. NOTE - Hazardous flammable waste cannot be stored closer than 50 feet from the property line.

2. All organic liquid waste and non waste containers larger than 20 gallons must be stored in a secondary dike-container capable of containing spills from the ruptured container.

T.371.3.3.5 Labeling

A. All containers of hazardous waste must be labeled in accordance with U.S. Department of Transportation regulation with the following minimum information:

1. Hazardous waste. Federal law prohibits improper disposal. If found, contact the nearest police or public safety authority, or the U.S. Environmental Protection Agency.

2. Proper DOT Shipping Name

3. Manifest Document No

4. Generator Name, Address, and EPA ID No

5. Date of Accumulation

6. EPA Waste No

B. All other applicable labeling as per New Jersey and/or Pennsylvania state laws must be placed on any applicable waste containers by the Contractors.

T.371.3.3.6 Waste Transportation

A. Provide name, address, permits, and licenses for the hazardous waste transporter to the Engineer for review and approval. The transporter must be in compliance with all applicable requirements of the 40 CFR 263, 49 CFR 171-179, NJAC, Title 7, and PA Title 25, Chapter 260-270 regulations.

B. Provide name, address, permits, and licenses for the hazardous waste disposal facility to the Engineer for review and approval. The disposal facility must be in compliance with all applicable requirements of the 40 CFR 264, 40 CFR 268, NJAC, Title 7, and PA Title 25, Chapter 260-270 regulations.

C. Contractor is to provide Certificate of Final Disposal for each shipments of hazardous waste from the TSD facility.

D. The disposal of all non hazardous waste must be in conformance with all applicable Pennsylvania regulations Title 25, Chapter 273, 277, and 278 and NJAC, Title 7, as applicable.

E. When abrasive materials are used to remove existing paint, TSDF facility must be notified to stabilize the lead in the waste to TCLP levels below 0.75 PPM prior to disposal.

T.371.3.3.7 Waste Management Training

A. Contractor is to provide training for his workers for the safe handling and processing of hazardous waste. Include the training requirements of 40 CFR 265.16 for the proper handling of hazardous waste at work areas. All training documents must be maintained and available to the Engineer for inspection. At a minimum the training must include:

    1. Methods that may be used to detect a release of a hazardous chemical(s) in the work place.
    2. Physical properties and health hazards associated with each chemical.
    3. Protective measures to be taken in order to reduce the risk of chemical exposure.
    4. Safe work practices, emergency responses and the proper use of Personal Protective Equipment (PPE).
    5. Information on the Hazard Communication Standard including:
        a. Labeling and Warning systems.
        b. An explanation of the Material Safety Data Sheets (MSDS) and their site location.

T.371.3.4 DAILY AND FINAL CLEANING INSPECTIONS

A. Along with the other visual assessment and inspection duties, the Contractor is to perform daily and final cleanup evaluations. The intent of these inspections will be to detect releases or spills of dust and debris that could become deposited on surrounding equipment, property, soil, water, and sediment. These observations will be made at areas of possible emissions such as: paint removal locations, containments, dust collection and grit recovery equipment, and at areas where waste will be drummed and stored. The Contractor must document any instances where dust and/or debris are observed and to take action to remediate the adverse condition. All such events and the frequency of the inspection, even when no issue of concern is found must be recorded in the Competent Person's daily log report.

T.371.3.5 WORKERS PROTECTION AND COMPLIANCE SUBMITTAL PLAN

A. The Contractor is to provide a Workers Compliance Plan as discussed in this document's Section 371. All the workers protection rules and regulations must apply to the Contractor's personnel, as well as his subcontractors. If the Contractor's Subs are implementing another safety and health plan, then prior to start of work on site, a copy of the subcontractor's safety plan must be submitted to the Engineer for review and approval.

T.371.3.6 POTENTIAL SOURCES OF LEAD

A. During paint removal projects, the following job functions and locations in addition to others may have potential exposure to lead and other toxic dust and material:

1. Abrasive blast cleaners removing lead if applicable to this project
2. Vacuum cleaning spent blast medium and lead contaminated debris
3. Staging area equipment
4. Power tool operations
5. Waste management and transfer operations
6. Support work in or near paint removal operations
7. Contaminated material installation and dismantling
8. Working near or in any contaminated areas
9. Coating inspection in contaminated areas
10. Health & Safety professionals supervising site operations

T.371.3.7 ACTION LEVELS AND PERMISSIBLE EXPOSURE LIMITS

A. The Action Level for lead is 30 µg/m3 as an eight (8) hour Time Weighted Average (TWA), the Action Level for cadmium is 2.5 µg/m3 as an 8 hour

TWA, the Action Level for hexavalent chromium (CR(VI)) is 2.5 µg/m3 as an 8 hour TWA and the Action Level for inorganic arsenic is 5 µg/m3 as an 8 hour TWA. Exposure to more than one toxic metal may require establishing a cumulative Action Level that is lower than the published value. For any heavy metal that there is no established Action Level, an Action Level ½ of the PEL value for that metal shall be established. If a PEL does not exist, establish the Action Level at ½ of the Threshold Limit Value (TLV) found in Appendix A of 29 CFR 1926.55 (e.g., if the TLV is 5 µg/m3, establish the Action Level at 2.5µg/m3).

B. The PEL for airborne lead exposure is 50 µg/m3 as an 8 hour TWA. The PEL for cadmium is 5 µg/m3 as an 8 hour TWA, the PEL for hexavalent chromium (CR(VI)) is 5 µg/m3 as an 8 hour TWA and for inorganic arsenic is 10 µg/m3 as an 8 hour TWA. The TLVs for other metals can be found in 29 CFR 1926.55.

C. The Permissible Exposure Limit (PEL) of 50 micrograms of lead per cubic meter of air will be used, and all other exposure criteria such as action levels, duration of sampling, extended work schedules, monitoring and analytical methods, etc. shall be in compliance of OSHA 29 CFR 1926.62. All applicable PELs will be reduced for extended work shifts as follows:

400/hours worked = Permissible Exposure Limit

8 hr shift: PEL = 50µg/m^3
10 hr shift: PEL = 40µg/m^3
12 hr shift: PEL = 33µg/m^3

T.371.3.8 EXPOSURE MONITORING ASSESSMENT

A. Contractor shall provide for each job function, having potential exposure to lead or other heavy metal dusts, an initial workers exposure monitoring to determine if exposures are within acceptable limits, or what additional requirements and corrective measures must be undertaken.

B. Collect and analyze all samples in compliance with appropriate OSHA and NIOSH methods 7082 for lead, Method 7048 for cadmium, Method 7300 for chromium, Method 7600 for hexavalent chromium and Method 7900 for inorganic arsenic.

C. Contractor shall provide personal exposure air sampling during the initial 2 days of any new task for each job classifications performing the target task. Each sample will include an entire work shift with a minimum sample time of 7 hours. Personal air samples will be obtained at least twice a year or whenever site conditions change from those observed during the initial exposure monitoring. Air sampling results will be made available to the

Engineer within 5 days of Contractors receiving the laboratory results and thereafter included in the CIH bimonthly summary reports. Any of the Contractor's subcontractors on site will also be notified of the presence and the nature of lead exposure and can choose to conduct their own similar monitoring or to be included in Contractor's personal air monitoring program.

D. Prior to documentation of lead exposure assessment, workers must use respiratory protection in accordance with the selection guide found in Table 2 of this Section.

E. If exposures to toxins exceed the PEL for lead even after implementation of all feasible engineering or administrative controls, then the protection factors (PF's) for the respirators will be used to assess compliance with the PELs. Follow-up air sampling results will be used to establish and verify that exposures are still within the allowable limits.

F. Air samples will be collected by experienced Industrial Hygienists employed by, or under the direct supervision of Contractor's CIH. Air samples will be analyzed in accordance with NIOSH Method 7082 or equivalent, by an approved Laboratory. See laboratory credential requirements as well as reporting format and response time under this Section. Employees must be notified in writing of the monitoring results within five (5) days of the Contractor receiving the results.

T.371.3.9 WORKERS PROTECTION IN REGULATED AREAS

A. Low flow air monitoring pumps will be used to obtain area samples at the perimeter of the restricted work zone to determine the limits of the exclusion zone. The restricted area will be designated as anywhere exposures exceed the OSHA Action Level for the target contaminants or in the absence of Action Level definition, a limit defined under this Section. Caution tape and/or hazard warning signs will be used to identify this area. See Regulated Area Sampling for more details.

T.371.3.10 RECORD KEEPING

A. Contractors CIH is to provide a monthly summary report outlining the evaluations of workers examination results, blood lead testing results, exposure monitoring results, and any other relevant information regarding the well being and safety of the workers on site. The CIH is to evaluate site conditions that may have resulted or pose potential hazard to the health of the workers as it applies to the provisions of this section regarding workers health and safety. Interventions as the result of violations in OSHA regulations increase in blood lead results, or excess exposures must be included in the CIH report. The CIH monthly report must be submitted no later than the 10th calendar day after the end of each month.

B. All records related to the training, medical examinations, blood lead analysis, exposure monitoring, respiratory fit testing, Competent Person's inspection logs, and other related project documentation must be on file at the project site and available for the Engineer or his designated representative's inspection and recording. (Employees' personal medical records are an exception under the medical records privacy laws and not subject to review by anyone other than qualified employer staff.)

C. Detailed records of the exposure shall be in compliance with 29 CFR 1926.62, as given below. All personal air samples results will be maintained by the Contractor for at least 30 years beyond termination of employment. A copy of all exposure monitoring reports will be kept on site. The records must include:

1. The date(s), number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine employee's exposure;

2. A description of the sampling and analytical methods used and evidence of their accuracy;

3. The type of respiratory protective devices worn, if any;

4. Name, personal identification number such as social security number, and job classification of the employee monitored; and

5. The environmental variables that could affect the measurement of employee exposure.

T.371.3.11 ENGINEERING CONTROLS

A. All feasible engineering controls should be used to minimize lead dust exposure to the greatest extent possible from the very beginning of this project. Additional control measures may be necessary depending on the results of air monitoring once the project begins. The Contractor shall provide all engineering controls for reducing the exposure's that are above the target PEL.

T.371.3.12 PROTECTIVE WORK CLOTHING AND EQUIPMENT

A. Work clothing will be laundered and/or replaced on a weekly basis if the Time-Weighted-Average (TWA) exposure to lead is greater the 50 $\mu g/m^3$. Work clothing will be provided daily if the TWA exposure to lead is greater than 200 $\mu g/m^{3.}$ Work boots must remain at the job site for the duration of the job.

B. Contractor shall provide work coveralls for the DRPA personnel and the consultant staff working on site in relation to this Contract.

C. Disposable tyvek coveralls may be used during this project. Tyvek suits will be disposed of as hazardous waste after each use. The used tyvek suits will be stored with other PPE waste. If tyvek suits are being used, laundering of work clothing will not be necessary for this project.

T.371.3.13 SIGNS

A. Post caution signs around each regulated area. If there is no regulation for the metal of concern, use the legend for the CAUTION sign as found in 29 CFR 1926.62 as the basis, and insert the name(s) of the other toxic metals. Sign requirements for lead, cadmium, and inorganic arsenic are as follows:

WARNING
LEAD WORK AREA
POISON
NO EATING OR SMOKING

DANGER, CADMIUM
CANCER HAZARD,
CAN CAUSE LUNG AND KIDNEY DISEASE,
AUTHORIZED PERSONNEL ONLY,
RESPIRATORS REQUIRED IN THIS AREA

DANGER
INORGANIC ARSENIC
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY
NO SMOKING OR EATING
RESPIRATOR REQUIRED

B. Use signs that are a minimum of 8 ½ inches by 11 inches in size with black block lettering on a white, yellow, or orange background. Do not use caution ribbons as a substitute for signs.

C. Ensure that all workers entering the regulated area have been properly trained. Eating, drinking, smoking or chewing of tobacco product in the regulated area is prohibited and shall be subject to disciplinary action if offenders violate this rule.

T.371.3.14 RESPIRATORY PROTECTION

A. Engineering and administrative controls shall be implemented to reduce airborne lead concentrations below 50 $\mu g/m^3$ for lead dust without regard to

respiratory protection. Where such controls are inadequate to reduce exposure to below the PEL, respiratory protection will be incorporated during all phases of work in regulated areas. A half-face air purifying HEPA respirator will be considered the minimum respiratory protection to be used by all workers within the regulated areas or when respirators are required for usage in an area. The initial type of respirator for each work task or job function is given in the table provided below, along with its NIOSH/OSHA protection factor. Results of air monitoring for worker exposure may require adjustment to be made to this selection table. Workers will be trained in the proper use, cleaning, maintenance and storage of all respirators, and how to secure a proper fit. Contractor's CIH or the Competent Person under the direct supervision of the CIH will conduct regular inspections of the program to ensure the proper respiratory and personal protective equipment are being used.

T.371.3.14.1 Selection of Respirators

Airborne Concentration of lead or condition of use	**Required Respirator**
Not in excess of 500 ug/m³	Half mask air purifying respirator with high efficiency filters Half mask supplied air respirator operated in demand (negative pressure) mode.
Not in excess of 1,250 ug/m³	Loose fitting hood or helmet- powered air purifying respirator with high efficiency filters. Hood or helmet- supplied air respirator operated in a continuous flow mode
Not in excess of 2,500 ug/m³	Full face-piece air purifying respirator equipped with high efficiency filters Tight fitting powered air purifying respirator with high efficiency filters Full face-piece supplied air respirator operated in demand mode Half-mask or full face-piece supplied air respirator operated in a continuous-flow mode. Full face-piece self-contained breathing apparatus (SCBA) operated in demand made.
Not in excess of 50,000 ug/m³	Half-mask air purifying respirator operated in pressure demand or other positive-pressure mode.
Not in excess of 100,000 ug/m³	Full face-piece supplied air respirator operated

	in pressure demand mode
Greater than 100,000 ug/m³ or any unknown concentration or fine fitting	Full face-piece supplied air respirator operated in pressure demand or other positive pressure made.

NOTE: Respiratory protection may be downgraded or upgraded after assessment of worker lead dust exposure in accordance with 29 CFR 1629.62

T.371.3.14.2 Respiratory Protection Training

A. All employees shall receive training in the proper use, cleaning, maintenance and storage of respirators, and how to replace filters and obtain proper fit. Said training will be performed by Contractor's Head Safety Officer (HSO) or the CIH and shall be documented.

T.371.3.14.3 Fit Test

A. Contractor is to perform quantitative face fit-testing at the time of initial fitting and at least every six months thereafter for each employee wearing negative pressure half- and full-face respirators, as required by 29 CFR 1926.62 and 1910.134.

T.371.3.14.4 Cleaning, Maintenance and Storage

A. Respirators shall be cleaned after each day's use by the individual. A special wash area must be provided and maintained in the decontamination area for this purpose. Towellettes will be available for daily cleaning. Weekly cleaning will involve using soap, warm water, brushes and rinse water which will be provided, as well a storage area where the devices can be dried and be stored until used again. All employees must receive instructions on the proper cleaning techniques and be given the responsibility for daily cleaning of their respirators. Inspections will be made periodically by the HSO or the Competent Person to ensure that respirators are being properly cleaned. Periodic wipe samples for detecting lead on the inside of the respirators may be taken by the Contractor to determine the adequacy of the respirator's cleaning procedures. Wipe sampling will be done within the first month of the project and at least every six months or more often as requested by the Engineer.

B. During cleaning, respirators will be inspected for defects and worn parts, and repaired or replaced as necessary. Also, respirators shall be inspected by the individual worker prior to use. Extra filters shall be made available and filters shall be replaced whenever necessary to allow easy breathing by the user. Replacement parts shall likewise be made available to the workers and instructions given in the proper replacement of those parts. New respirators and respirator replacement parts will be maintained on site. Daily inspections

by Competent Person or the HSO will confirm that worn parts are being replaced. All spent filters are to be disposed of as hazardous waste by the Contractor.

T.371.3.14.5 Medical Approval

A. All workers required to use negative pressure respirators must receive approval from the Occupational Physician that they are physically fit for use of the unit and can work in the environment they are assigned to work. This certification shall be made in writing as part of the medical clearance program submitted by the Contractor. Any worker having difficulty breathing or working while using an intact respirator must be checked by the physician again to assure that they may continue to work in the area requiring respiratory protection.

T.371.3.14.6 Baseline Examinations

A. The elements of the baseline examination for the medical surveillance program will be as follows:

1. Complete work history with special emphasis on past lead exposure.

2. Complete medical history with special emphasis on personal habits such as smoking and hygiene, and any past lead-related health effects including gastrointestinal, renal, hematologic, cardiovascular, reproductive and neurological problems.

3. Thorough physical examination with special emphasis to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, pulmonary and neurological systems.

4. Blood pressure measurement.

5. Blood testing for the following determinations:
   - Blood lead
   - Zinc protoporphyrin (ZPP)

6. Pulmonary function testing.

7. Electrocardiogram (optional, at physician's discretion).

8. PA view chest X-ray (optional, at physician's discretion).

T.371.3.14.7 Inspections

A. In addition to the inspections discussed in the above paragraphs of this Section random inspections will be made by the Contractor to assure that respirators are properly selected, used, cleaned and maintained. Written records of these and all inspections of the respirators by the Contractor will be made and maintained for the duration of the project, plus one year thereafter. The respirator inspection records may be provided in the CIH Summary reports but either way must be made available to the Engineer upon his request.

T.371.3.15 EYE AND FACE PROTECTION

A. All employees will be required to wear approved safety glasses at all times when working within the Contract limits.

T.371.3.16 HEAD, SAFETY VEST, AND FOOT PROTECTION

A. All workers will be required to wear non conductive hard hats meeting the requirements of ANSI Z89.1 at all times. Hard hats must also be equipped with chinstraps if necessary to prevent them from blowing off in the high winds encountered on the bridge.

B. **Reflectorized Apparel** -Reflective vests / high visibility clothing will be worn on site at all times within the Contract Limits.

1. Vests and high visibility apparel will be orange, yellow, or strong yellow-green in color or fluorescent versions of these colors (flaggers will wear orange) and will include retroreflective material, white or silver in color, visible for a minimum of 300 m in all directions under headlight illumination.
2. Retroreflective clothing will be designed to clearly identify the wearer as a person and be visible through a full range of body motions.
3. Retroreflective clothing and vests will be closed front and rear. Open front vests will not be permitted.
4. All reflective clothing and vests will be in clean condition or replaced as necessary to maintain visibility and reflectivity.

C. In addition, the Contractor shall comply with all requirements set forth in T.X.2.1(5). These requirements also apply to vehicle and equipment operation when out of an enclosed cab.

T.371.3.17 NOT USED

T.371.3.18 PERSONAL HYGIENE FACILITIES AND PRACTICES

A. Contractor is to supply all personal protective clothing and equipment (PPE) needed to protect the workers, DRPA employees and their representatives associated with this project from the work site hazards. Provide replacement or repair of the PPE's as necessary to ensure its proper intent usage on site. The Contractor is responsible for proper cleaning and disposal of all PPE.

B. Contractor is to supply hygiene facilities as required by 29 CFR 1926.51, site conditions, contract document interpretation and as approved by the Contractor's CIH and Engineer. Engineer's designated representatives as well as DRPA personnel who are associated with this project or are present on the work site on project related business have the right to use the Contractor's hygiene facilities as needed.

C. Contractor is to provide all potable water required for drinking and hygiene purposes as discussed above.

T.371.3.19 LUNCH FACILITY

A. A lunch facility will be setup and maintained by the Contractor. The Competent Person must inspect and ensure that the lunch facility meets health and safety protocols.

B. Lunch facilities should be setup in a clean area near the work area, away from all sources of contamination. Contaminated disposable coveralls must be removed, and hands and face must be washed prior to eating, drinking or smoking. All work clothing must be cleared of loose dust by vacuuming with a HEPA vacuum prior to entering the lunch area. The lunch area table (if used) must be cleaned prior to placing food on it, and again after workers have returned to work. Signs will be displayed in the lunch area to this effect. Wipe samples of the tables, seats and various other components of the eating area(s) will be taken to assess cleaning procedures. Levels below 40 $\mu g/ft^2$ will be considered acceptable.

T.371.3.20 LAUNDERING OF COVERALLS

A. Contractor shall provide work coveralls for the DRPA personnel and the consultant staff working on site in relation to this Contract.

B. Laundering Services can be provided by the Contractor for his employees as well as DRPA and their consultant representatives on site. Contractor shall inspect and ensure that the laundering of the coveralls meets health and safety protocols for its employees.

C. Disposable tyvek coveralls may be used during this project. Tyvek suits will be disposed of as hazardous waste after each use. The used tyvek suits will be stored with other PPE waste. If tyvek suits are being used, laundering of work clothing will not be necessary for this project.

D. Contaminated work clothing will be placed in plastic bags and given to a laundering service. The laundry service will be informed that the clothing may be contaminated with lead-bearing dust and that the clothing must be handled in such a fashion as to minimize the generation of air-borne dust, and/or skin contamination or surfaces that may come into contact with the skin. Plastic bags containing clothing to be laundered will be labeled with the following warning:

Caution: Clothing contaminated with lead.
Do not remove dust by blowing or shaking. Dispose
of lead contaminated wash water in
accordance with applicable local, state, or federal regulations.

E. If the clothing has been exposed to cadmium, chromium, inorganic arsenic, or other metals, modify the above text in accordance to the regulation governing the target toxin.

F. If the clothing is washed on site, provide containers for the collection of water after filtration. Contractor must comply with all testing and disposal requirements outlined in this specification for the proper handling and disposal of the waste water.

G. The contact information and letters of acknowledgements from the laundering facility will be provided to the Engineer by Contractor prior to employing such services. The letter must indicate that the facility is aware of the nature of the lead contaminants in the clothing and that it can properly and legally provide the cleaning services.

T.371.3.21 HOUSEKEEPING

A. All work areas will be maintained as free as practical of accumulation of lead. Dry or wet sweeping of lead-containing debris, and cleaning with compressed air (non-production related usage) is prohibited. Only vacuums equipped with a HEPA filter, or wet wipe cleaning will be used for such housekeeping purposes

T.371.3.22 HYGIENE RULES

A. The following rules shall apply at a minimum to the Contractor workers on site:

JOB SITE HYGIENE RULES

1. ONLY APPROPRIATE PROTECTIVE WORK CLOTHING CAN BE WORN WHILE WORKING.

2. ALL WORK CLOTHING MUST BE VACUUMED FOR LOOSE DUST PRIOR TO LEAVING REGULATED AREAS FOR BREAKS OR LUNCH.

3. ALL WORK CLOTHING MUST REMAIN AT THE JOB SITE.

4. HANDS AND FACE MUST BE WASHED PRIOR TO EATING, DRINKING OR SMOKING.

5. EATING SURFACES MUST BE CLEANED BEFORE AND AFTER EATING.

6. SHOWERS WITH SOAP AND HAIR WASHING MUST BE TAKEN BEFORE LEAVING JOB SITE EACH DAY FOR THOSE EMPLOYEES WHOSE WORK AREAS HAD EXPOSURES ABOVE PEL.

7. SMOKING, EATING, APPLYING COSMETICS AND THE PRESENCE OF TOBACCO PRODUCTS, FOODSTUFFS OR COSMETICS ARE PROHIBITED IN ALL WORK AREAS.

T.371.3.23 MEDICAL SURVEILLANCE PROGRAM

A. All employees potentially exposed to lead are required to enter the medical surveillance program to reveal medical conditions which could predispose an individual to excess risk from working on this job and to obtain medical clearance to wear a negative-pressure respirator.

T.371.3.23.1 Program Elements

A. Provide a medical surveillance and monitoring program in accordance with the DRPA Owner Controlled Insurance Program, Administrative Safety Guide.

T.371.3.23.2 Notification of Employees

A. All employees tested and/or examined under this medical surveillance program will be notified in writing of the results of testing within five working days after receipt of the results.

T.371.3.23.3 Record Keeping

A. Medical records will be maintained for the duration of employment plus 20 years, or total of 40 years, whichever is longer. Each worker or his or her duly appointed representative will be able to access those records upon written request. Those records will include but not limited to the following items:

1. Name, Social Security Number and job description.
2. Copy of physician's written opinion, including clearance to wear a respirator.
3. Results of exposure monitoring.
4. Records of medical complaints related to lead exposure.
5. Copy of medical examination results including medical work history.
6. If available, descriptions of the laboratory procedures and a copy of any standards or guidelines used to interpret the tests or references to that information.
7. Copies of biological monitoring results.
8. If an individual worker is removed from exposure to lead, the following records will be kept as well:
   a. Date of each occasion that the individual was removed from exposure and returned to work.
   b. A brief explanation of how each removal was or is being accomplished.
   c. A statement indicating the reason for removal and blood level results.

T.371.3.24 TRAINING

T.371.3.24.1 General Health and Safety Training

A. Contractor shall provide a training program to all his employees who are exposed to lead at or above the action level on any day and must assure employee's participation in the program. Contractor's personnel shall be trained in the hazards of lead, the OSHA Lead Standard, the safety procedures and requirements of Contractor's Safety Plan, and all currently approved environmental regulations including those for the proper handling and management of hazardous waste. At a minimum the following topics must be covered in the training class to all qualifying employees:

- HEALTH EFFECTS OF EXPOSURE TO LEAD
- ROUTES OF EXPOSURE
- PERSONAL PROTECTIVE EQUIPMENT
- PERSONAL HYGIENE & DECONTAMINATION
- MEDICAL SURVEILLANCE PROGRAM
- MEDICAL REMOVAL PROTECTION & PROCEDURE

- EXPOSURE MONITORING
- THE OSHA LEAD STANDARD
- THE LEAD HEALTH AND SAFETY PLAN (LHASP)
- STANDARD OPERATING PROCEDURES HAZARDOUS WASTE PROCEDURES (40 CFR 265.16)
- EMERGENCY RESPONSE
- ENGINEERING CONTROLS AND WORK PRACTICES
- INFORMATION REGARDING CHELATING AGENTS
- EMPLOYEE RIGHTS TO INFORMATION

T.371.3.24.2 Site-Specific Training

A. All Contractor personnel shall be provided with training that will specifically address the activities, procedures, monitoring, and equipment for site operations. The training will include:

    1. Site and facility layout
    2. Site specific fall protection hazards
    3. Emergency services and communication
    4. Site evacuation procedure
    5. Respiratory protection and use
    6. Lead hazard
    7. A general discussion on ladder/scaffold safety, electrical hazard, fire prevention

B. Re-training will be conducted annually or if site conditions or the employee's actions demonstrate a need for an update or at the request of the Engineer.

T.371.3.25 EMERGENCY RESPONSE PLANNING AND EQUIPMENT

A. The Contractor shall develop a written Emergency Response Plan (ERP) to be implemented at the site. This plan must be coordinated with the local, state and federal disaster and emergency management plans as appropriate. In addition it may be necessary to communicate the nature of work on site with a local hospital in advance in the event a patient is transported to the hospital from the project site. Directions to the hospital must be posted on site and a copy of it must be placed in all site vehicles when this Plan is in effect.

B. The primary response to any emergency will be to protect the health and safety of employees, contractors, sub-contractors and visitors on-site, as well as the community and environment.

C. During the initial training and new employee's orientations as well as during the site briefings held periodically, such as tool box safety meeting, all workers must be trained in and reminded of provisions of the emergency response plan, communication systems, and evacuation routes. The plan must

be reviewed and revised when necessary, on a regular basis by the Contractor's CIH or Safety Officer.

D. Workers are to be familiar with techniques of hazard recognition from pre-assignment training and site-specific briefings. The Contractor must ensure that devices or equipment (air horn, two-way radio, mobile phone, emergency vehicles, directions to hospital, emergency phone numbers, etc.) are available to personnel and that staff is familiar with their function and usage.

E. If a worker discovers a fire, chemical spill or release, or other processes necessitating emergency action, he or she will immediately notify the Contractor's HSO, the Chief Inspector, or the Resident Engineer. An immediate decision will be made as to whether to evacuate the site or other actions to be taken.

F. In the event of an emergency that necessitates an evacuation of the site, the following alarm procedures will be implemented:

THREE LONG BLASTS OF A COMPRESSED AIR HORN

G. When notified to evacuate, all personnel will be expected to proceed to the closest site exit, and mobilize to the safe distance area associated with the evacuation route. Personnel will remain at that area until the Re-entry Alarm (**single blast of air horn**) is sounded or an authorized individual provides further instructions. Air horns will be located in the Exclusion Zone, the decontamination zone, by hazardous waste areas, and in the field office.

H. In general, employees should proceed to a designated meeting location that is upwind and uphill from the site or location of the incident, unless otherwise instructed by supervisory personnel. Wind socks and/or flagging may be employed on-site to indicate the upwind direction to which evacuation should proceed.

I. The Contractor is to provide a list of names and telephone numbers for emergency contact personnel. This list must be posted in the lunch area or where the nearest phones are located. In the event of a medical emergency, personnel will take direction from the HSO and notify the appropriate emergency organization. In the event of a fire or spill, the HSO will notify the appropriate local, state and federal agencies.

J. Any person who becomes ill or injured in the Exclusion Zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious the victim should be brought to a clean area, if possible, before first aid is administered. Copies of MSDS or a person must accompany the patient to the hospital informing the

hospital staff of the contaminant'(s) presence. First aid should be administered by trained personnel while waiting for an ambulance or paramedics. All injuries and illnesses must be immediately reported to the HSO. Any person being transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to at the site.

K. In the event of a spill or leak, the Contractor must:

1. Locate the source of the spillage and stop the flow if it can be done safely, and

2. Notify the HSO or the Competent Person and the Engineer. Other agencies such as the Coast Guard or appropriate State Agencies will be contacted by the said personnel as warranted. If a total containment failure occurs, the DRPA Engineer shall be notified immediately.

L. When contacted, the following information may be necessary for verification:

1. The material spilled or released
2. Location of the release or spill
3. An estimate of the quantity released and the rate at which it is being released
4. Any injuries involved
5. Fire and /or explosion or possibility of these events occurring
6. The area and material involved in the location of the fire or explosion

M. The Contractor's field locations shall contain the following emergency equipment. The HSO or the Competent Person must ensure that this equipment is on-site:

1. First Aid Kit;
2. Fire Extinguisher – one (1) 15 lbs. multipurpose dry chemical portable fire Extinguisher;
3. Eye Wash;
4. Two-way radio or Mobile phone; and
5. Air horn

N. Following all emergency response actions and activation of this plan, the HSO will conduct a debriefing session of all key personnel involved. The response will be critiqued, documented and response plan revised if necessary. Corrective actions will be listed where procedures were inadequate or need improvement. Responsible persons will be listed and held accountable for the follow-up.

O. All contingency plan records, medical procedures records, reported leaks or spills, evacuation routes, etc., will be kept at the job site for the project duration.

T.371.3.26 CERCLA REPORTABLE RELEASES

A. Spills of hazardous waste material greater than the Reportable Quantities (in case of lead – ten or more pounds in 24 hours period) must be reported under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

B. Reportable quantities of hazardous substances in waterways are found in Section 311 of CERCLA.

C. All reporting of spills into the ground, water or air must be in compliance of the reporting requirements of this Section.

T.371.3.27 PAINT APPLICATION

A. Paint and solvent are hazardous due to their flammability and/or potential toxicity. Paint application shall be in accordance with the DRPA SAM. Proper safety procedures must be taken into consideration for the storage, mixing, and handling of paint and waste paint materials and containers. Proper ventilation both to lower flammable vapor in the air as well as to lower workers exposure below the OSHA mandated Permissible Exposure Limits (PEL) must be employed on the work site.

B. Monitoring of flammable environment through the use of LEL meter may be requested by the Engineer. In confined spaces and enclosures, the Contractor must consider establishing work guidelines to monitor and eliminate the possibility of explosive or flammable atmosphere to occur.

1. “No smoking signs” and “flammable material” must be posted within 10 feet of the paint mixing area.

2. All paint mixing areas must be approved by the Engineer or his designated representative.

3. Opened paint or opened solvent-cans shall not be stored in new paint storage area.

4. A class I Division II electric heating or cooling equipment must be installed in a new paint storage area if the Contractor sees the need to regulate the storage temperature.

5. Proper containers to store flammable material including flammable solvent

and paint must be utilized on site. All containers used for this purpose must be approved by a recognized national agency such as Underwriter's Laboratories.

6. Fire extinguishers of right size and type must be placed in an appropriate distance from the paint mixing area.

7. Use explosion proof lighting in the paint mixing area. All electrical equipment used in the process of mixing paint must be approved for such operation.

8. Material Safety Data Sheet must be available to the workers responsible for mixing paint.

9. Spill kit must be available close to the paint mixing area at all times.

10. Ground cover and when requested by the Engineer or his representative, secondary containers may be used in the paint mixing area to control accidental paint spills on the platform or near storm/sewer drains.

T.371.3.28 CONTAINMENT SCAFFOLDING INSPECTION LOG

A. Maintain and make available for review by the Engineer, a daily log of the inspections of scaffolding, platforms, and wire ropes in accordance with the OSHA requirements. Conduct the inspection each shift, and after any occurrence which could affect the structural integrity of the scaffolding or wire suspension ropes.

T.371.3.29 CLEANLINESS OF MATERIAL AND EQUIPMENT AND FINAL INSPECTION

A. Provide materials that are clean and free of lead contamination prior to entry to or removal from the project site. If necessary, under the direction of the Engineer or his representative, collect surface wipe samples for lead dust to verify condition or degree of cleanliness. An acceptable criteria of <400 ug/sq ft will be used. Any equipment or machinery utilized for the collection and processing of the lead contaminated material must be clean and free of loose lead dust in its storage space prior to leaving the project site.

B. At the completion of the project, inspect the soil and surrounding properties within 200 feet of the construction zone for cleanliness. Unless specified otherwise by the Engineer, the soil, water, and sediment will be considered to have been impacted by project activities if paint chips or project debris are visually present on the ground, water, or in sediment. The Contractor is responsible to return any damaged property to its original condition at his own

expense.

T.371.3.30 HISTOPLASMOSIS

A. Histoplasmosis is a disease caused by the fungus Histoplasma capsulatum, resulting from exposure to pigeon droppings. Prior to working in any area where pigeons have been nesting, an inspection will be made to determine the extent and build up of pigeon droppings. During inspection eye protection, rubber gloves, coveralls, booties and respiratory protection (1/2 face respirator with P-100 HEPA filters) will be used. If it is determined that a significant build up of pigeon waste is present then the workers engaged in the cleaning of the pigeon waste shall wear the personal protective equipment referenced above. The material will be scraped or washed away. The workers will keep the material wet at all times during the removal and disposal. Compressed air will not be used to remove pigeon waste in areas of significant buildup. All employees exposed to pigeon droppings will demonstrate a high degree of hygiene, even if exposure is casual. Pigeon droppings may be washed with a germicidal agent if permitted by the local or state guidelines.

END OF SECTION

Table -1

Removal Method	SSPC Class[2]	Material Flexibility	Material Permeability[3]	Support Structure	Material Joints	Containment Entryway	Ventilation System Required	Negative Pressure Required	Exhaust Filtration Required
Power Tool Cleaning w/ Vacuum	3P	Rigid or Flexible	Penetrable	Minimal	Partially Sealed	Open Seam	Natural	Not Reqd	Not Reqd
Chemical Stripping	3C	Rigid or Flexible	chemical Resistant	Minimal	Partial Seal	Open Seam	Natural	Not Reqd	Not Reqd
Wet Methods[4]	4W	Rigid or Flexible	Water Permeable	Flexible	Partially Sealed	Open Seam	Natural	Not Reqd	Not Reqd

[1]This table provides general design criteria only. Other combinations of materials may provide controls over emissions equivalent to those combinations shown above.

[2]The SSPC Classification is based on SSPC Guide 6.

[3]Permeability addresses both air penetrability and water permeability as appropriate.

[4]Class 4W will capture dislodged paint chips and debris, but will not contain the water used for cleaning.

T.372 WORK PLATFORMS AND PROTECTION SHIELDS

T.372.1 GENERAL

T.372.1.1 DESCRIPTION

This work shall consist of designing and furnishing of all labor, materials, tools and equipment for the construction, erection, maintenance, removal and disposal of temporary work platforms and shielding to protect properties, the motoring public, pedestrians, construction workers and others from falling construction materials, debris and other objects from construction activities. Associated construction activities include, but are not limited to, superstructure and substructure repairs, jacking operations, bearing rehabilitation, drainage repairs, and sign structure repairs and replacements. This work includes, but is not limited to temporary platforms, temporary framing, temporary handrails, temporary protective devices, as required to perform the work and/or as indicated on the Contract Plans. The platform shall also serve as containment of debris and fall protection. Note that workers shall also be protected with a personal fall arrest protection system.

T.372.1.2 RELATED SECTIONS – Including, but not limited to:

A. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
B. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
C. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
D. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
E. T.325 – EPOXY INJECTION CRACK REPAIR
F. T.345 – T.353 – JACKING BRIDGE SUPERSTRUCTURE
G. T.354 – T.364 – BEARING REHABILITATION
H. T.326 – REPLACE NEOPRENE STRIP SEAL GLAND
I. T.327 – REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS
J. T.329 REPLACE TOOTH EXPANSION JOINT WITH MODULAR EXPANSION JOINT
K. T.330 – LONGITUDINAL JOINT SEALING, BRIDGE DECK
L. T.331 – LONGITUDINAL JOINT SEALING, SPLIT GLARE SCREEN MEDIAN BARRIER
M. T.332 – JOINT SEALING, SUBSTRUCTURE
N. T.333 – SUBSTRUCTURE MORTAR REPOINTING
O. T.334 – RECONSTRUCT CHEEKWALL
P. T.340 – MODIFY DRAINAGE SYSTEM
Q. T.343 – REPAIR DRAINAGE SYSTEM
R. T.365 – SPECIAL MORTAR REPAIRS
S. T.367 – FILL DRAINAGE PIPE WITH CONCRETE

T. T.398 – REMOVAL OF EXISTING SIGN STRUCTURE
U. T.373 – T.389 – STEEL SIGN STRUCTURE – MONOPIPE
V. T.390 – T.391 – STEEL SIGN STRUCTURE – TRUSS
W. T.392 – 3T94 – STEEL SIGN STRUCTURE REPAIR
X. T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES

T.372.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT – Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT – Publication 15, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. PennDOT – Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
4. AASHTO Guide Design Specifications for Bridge Temporary Works, 1st Edition with 2008 Revisions.
5. AASHTO LRFD Bridge Design Specifications 7th Edition, including latest interim revisions.
6. American Society for Testing and Materials (ASTM) Specifications.
7. American Society of Civil Engineers (ASCE) Publication 7-05, Minimum Design Loads for Buildings and Other Structures, latest edition.
8. AWS D1.5M/D1.5:2008, Bridge Welding Code.
9. Occupational Safety and Health Administration (OSHA).

T.372.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Provide erection drawings with design calculations, weights of stored materials, weights and operational data of the proposed construction equipment to be supported on the existing structures, and supporting data in sufficient detail to permit a structural review of the Contractor's

proposed design of temporary work. All calculations and drawings prepared by the Contractor shall be stamped by a Professional Engineer licensed to practice in the Commonwealth of Pennsylvania. The erection drawings shall be submitted sufficiently in advance of proposed use to allow for their review, revision if required, and approval, without delay to the Work.

C. Do not start the construction of any temporary work for which erection drawings are required until the drawings have been reviewed and approved by the Engineer. Such review will not relieve the Contractor of responsibility for any adverse effects resulting from the use of the erection drawings, or any other responsibilities under this Contract.
D. All erection drawings shall contain itemized materials list, with conforming material standards, manufacturer's trade names, as applicable, and with current model or code number of their products.

T.372.1.5 QUALITY ASSURANCE

A. Contractor's quality control requirements shall be in accordance with Section SP.25 of the Special Provisions.
B. The design of temporary construction work including allowable stresses, shall conform to an established and accepted design code or specification for such Work. The design shall be reviewed and approved by the Engineer. When manufactured devices are to be employed, the designs shall not result in loads on such devices in excess of the load ratings recommended by their manufacturers.
C. The design calculations and the erection drawings shall be signed and stamped by a Professional Engineer licensed in the Commonwealth of Pennsylvania.
D. Temporary construction work shall be constructed, erected and removed in conformance with the approved erection drawings. The Contractor shall verify that the quality of the materials and the loads are consistent with those assumed in the design. The loads of stored materials shall be dispersed as assumed.
E. Unless otherwise permitted, all temporary construction work shall be maintained and eventually removed from the job site, and shall remain the property of the Contractor upon completion of their use. The areas involved shall be restored to their original or planned conditions, and cleaned of all debris.

T.372.1.6 DELIVERY, STORAGE AND HANDLING

A. All required materials shall be delivered, stored and handled at the Contractor's designated area in accordance with the respective Sections.
B. Materials shall be carefully transported and handled to prevent damage. The materials shall be protected from the environment, damage and theft.

C. Temporary safety and debris nets shall be carefully handled and transported to prevent damage to the materials. Materials to be used shall be stored at the Contractor's designated area so as to prevent damage and theft.

T.372.2 MATERIALS

T.372.2.1 MATERIALS

A. Stress graded timber and lumber shall conform to the following:

1. ASTM D245
2. ASTM D2915
3. Stress graded timber and lumber used for the construction of temporary protective shields shall be "Fire-Retardant Treated".

B. Plywood shall conform to the following:

1. ASTM D3501
2. ASTM D3043
3. ASTM D3500
4. Plywood used for the construction of temporary protective shields shall be "Fire-Retardant Treated".

C. All other materials shall conform to the standards presumed in the design.

T.372.2.2 DESIGN CRITERIA

The work performed under this Section shall be guided by AASHTO's "Guide Design Specifications for Bridge Temporary Works" and as further specified herein.

A. Dead Loads – Dead loads shall be calculated according to the physical properties of the materials used in the construction.
B. Live loads – The live loads shall consist of working laborers, inspection staff, equipment and stored construction material. The minimum live load shall be 75 PSF and a concentrated load of 1,000 lbs so placed as to produce maximum stress within various components of the temporary work platforms. The contractor's calculation shall also include checking of the existing structure for the temporary dead and live loads.
C. Wind loads – The structure shall account for wind loads as specified by ASCE 7-05, Minimum Design Loads for Buildings and Other Structures,

for temporary conditions. The contractor is made aware that the tarps that are used as containment shall be either removed or battened down during such extreme events. The design shall be cognizant of such possibilities and shall be detailed such that the work of removal is facilitated.

D. Attachments to the existing structure are permitted provided no new holes are introduced for temporary bolting. If existing holes are used the holes shall be restored by placing bolts after the temporary structure has been removed.
E. Temporary protective shields shall be solid, and shall be constructed such as to prevent any dust, debris, concrete, steel, other materials or tools from falling through the shields. The shields shall be capable of resisting wind forces which may uplift the shields which may be carrying debris. Temporary protective shields shall be constructed of such materials and in such a manner so as not to become a fire hazard when devices emitting flames are in use
F. Temporary work platforms shall comply with the applicable requirements of OSHA regulations 29 CFR Part 1926.450.

T.372.3 CONSTRUCTION

T.372.3.1 ERECTION

A. Temporary structural steel support members shall be erected in conformance with the PennDOT Publication 408/2016, and in accordance with Contractor's erection procedure as reviewed and approved by the Engineer.
B. Erection and/or construction requiring timber, lumber, and plywood for Temporary Construction, shall be in accordance with Contractor's erection and/or construction procedure requiring timber, lumber, and plywood, as approved by the Engineer.
C. Construction, installation and maintenance of temporary work platforms and shielding shall be as follows:
    1. Construction, erection, maintenance and removal of Temporary Construction Work shall be performed in accordance with shop/erection drawings which were reviewed and approved by the Engineer. The drawings shall be prepared, signed, and sealed by a Professional Engineer licensed in the Commonwealth of Pennsylvania. The drawings, designs and details shall be in accordance with all applicable laws, rules, codes and regulations.
    2. The maintenance of the temporary work platforms and shielding shall include replacement in case of partial or complete failure, at no additional cost to the Authority. In the event of the Contractor's delay or inadequate progress in making repairs and replacement, the Authority may perform such repairs and replacement necessary to

restore the temporary work platform and shielding, either by its own forces or by other contractors, and deduct the Authority's costs therefor from any payments due or to become due to the Contractor under this Contract or any other agreement between the Contractor and the Authority. If such costs exceed the amount due the Contractor, the Contractor shall immediately pay such excess to the Authority upon demand.

3. If the Engineer, in his sole discretion, determines that the protective devices (solid shields, safety nets, and the like) are improperly installed and/or are not providing the required level of protection, or that the protective devices have not been properly maintained, all Work at the affected locations shall cease, until corrective measures acceptable to the Engineer are completed.

D. Removal and disposal of temporary construction work other than structural steel support beams.
   1. Temporary Construction Work, when no longer required for their intended task(s), as determined by the Engineer, shall be carefully removed and disposed of in accordance with all applicable laws, codes, rules and regulations.

E. Removal and disposal of temporary structural steel support beams
   1. Temporary structural steel support beams, including connections and fasteners, when no longer required, as determined by the Engineer, in coordination with Contractor's approved schedule of operations, shall be removed and disposed of in accordance with all applicable laws, codes, rules, and regulations.
   2. Reuse of temporary structural steel support beams and connection angles shall require prior written authorization of the Engineer. High strength bolts, nuts and washers shall not be permitted to be reused after bolts are fully tensioned.

F. Field quality control
   1. Temporary Construction Work shall be inspected at various intervals during the Work in order to maintain continuous structural integrity, maintain proper maintain proper lines and elevations safety levels.
   2. During the course of the Work, it may be necessary to disconnect, support, or adjust steel, which is to remain in the structure. For these situations, submit the procedures for disconnecting, supporting, or adjusting the steel, as necessary, to the Engineer for prior approval. The Contractor's proposals shall be approved prior to the actual commencement of any disconnecting, supporting or adjusting of steel.
   3. In the event any new or existing materials are damaged during the Work, repair or replace the damage, as directed by the Engineer, in a manner satisfactory to the Engineer, at no additional cost to the Authority.

G. Erection and removal of temporary protective shielding

1. In addition to complying with all Federal, State and Local laws, codes, rules and regulations and the requirements in the Contract Documents pertaining to the safety and health of individuals and the protection of property, the Contractor shall provide and maintain solid, fire retardant, dust-tight protective shields over all ”No Drop” zone areas as approved by the Engineer.
2. The protective shields shall be erected prior to the start of any Work over a “NO DROP” zone area. Protective shields shall be located so as not to become a fire hazard when torches are in use. The Engineer will be the sole judge as to whether or not sufficient protection has been provided to perform the Work.
3. Protective shield shall remain in place until Work over the area has been completed, and shall be removed only when directed by the Engineer. Prior to removal, each protective shield shall be cleaned to the satisfaction of the Engineer.
4. Obtain the approval of the Engineer before commencing any Work above the protective shields.
5. If during the Work, the Engineer, in his sole discretion, deems that the protective shields are not providing the required level of protection, or that the Contractor has failed to properly maintain the protective shields, all Work at the affected location shall cease until corrective measures acceptable to the Engineer are instituted and completed.
6. Repair damage to or replace damaged portions of the structures resulting from the use of Protective Shields. All repair and replacement methods shall be reviewed and approved by the Engineer. Welding to existing steel or drilling of holes in existing steel shall not be permitted.

END OF SECTION

T.373 – T.389 STEEL SIGN STRUCTURE – MONOPIPE

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 373 STEEL SIGN STRUCTURE – MONOPIPE, S-1 (DSS-0301)
ITEM 374 STEEL SIGN STRUCTURE – MONOPIPE, S-3 (DSS-0303)
ITEM 375 STEEL SIGN STRUCTURE – MONOPIPE, S-4 (DSS-0304)
ITEM 376 STEEL SIGN STRUCTURE – MONOPIPE, S-5 (DSS-0305)
ITEM 377 STEEL SIGN STRUCTURE – MONOPIPE, S-6 (DSS-0306)
ITEM 378 STEEL SIGN STRUCTURE – MONOPIPE, S-10 (DSS-0310)
ITEM 379 STEEL SIGN STRUCTURE – MONOPIPE, S-11 (DSS-0311)
ITEM 380 STEEL SIGN STRUCTURE – MONOPIPE, S-13 (DSS-0313)
ITEM 381 STEEL SIGN STRUCTURE – MONOPIPE, S-14 (DSS-0314)
ITEM 382 STEEL SIGN STRUCTURE – MONOPIPE, S-15 (DSS-0315)
ITEM 383 STEEL SIGN STRUCTURE – MONOPIPE, S-16 (DSS-0316)
ITEM 384 STEEL SIGN STRUCTURE – MONOPIPE, S-17EB (DSS-0317EB)
ITEM 385 STEEL SIGN STRUCTURE – MONOPIPE, S-17WB (DSS-0317WB)
ITEM 386 STEEL SIGN STRUCTURE – MONOPIPE, S-18 (DSS-0318)
ITEM 387 STEEL SIGN STRUCTURE – MONOPIPE, S-19 (DSS-0319)
ITEM 388 STEEL SIGN STRUCTURE – MONOPIPE, S-20 (DSS-0320)
ITEM 389 STEEL SIGN STRUCTURE – MONOPIPE, S-21 (DSS-0321)

T.373.1 GENERAL

T.373.1.1 DESCRIPTION: This work is the furnishing and construction of overhead and cantilever monopipe sign structures as indicated on the drawings and specified herein. This work includes the following sign structures:

Sign Structure S-1 (Static Monopipe Overhead Structure)
Sign Structure S-3 (Static Monopipe Cantilever Structure)
Sign Structure S-4 (VMS Monopipe Overhead Structure)
Sign Structure S-5 (Static Monopipe Overhead Structure)
Sign Structure S-6 (Static Monopipe Overhead Structure)
Sign Structure S-10 (VMS Monopipe Overhead Structure)
Sign Structure S-11 (Static Monopipe Overhead Structure)
Sign Structure S-13 (Static Monopipe Overhead Structure)
Sign Structure S-14 (VMS Monopipe Overhead Structure)
Sign Structure S-15 (Static Monopipe Overhead Structure)
Sign Structure S-16 (VMS Monopipe Overhead Structure)
Sign Structure S-17EB (VMS Monopipe Overhead Structure)
Sign Structure S-17WB (Static Monopipe Overhead Structure)

Sign Structure S-18 (Static Monopipe Overhead Structure)
Sign Structure S-19 (Static Monopipe Overhead Structure)
Sign Structure S-20 (Static Monopipe Cantilever Structure)
Sign Structure S-21 (Static Monopipe Overhead Structure)

T.373.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.244 – VARIABLE MESSAGE SIGN SYSTEM, WALK IN
D. T.245 – VARIABLE SPEED LIMIT SIGN SYSTEM, FRONT ACCESS
E. T.246 – LANE USE CONTROL SIGN SYSTEM, FRONT ACCESS
F. T.247 – CCTV CAMERA SYSTEM, STRUCTURE MOUNT
G. T.284 – SIGN LIGHTING 2 LED LUMINAIRES, STRUCTURE S-1
H. T.284 – SIGN LIGHTING 2 LED LUMINAIRES, STRUCTURE S-19
I. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS
J. T.395 – DRILLED CAISSON CONSTRUCTION, 48” DIAMETER
K. T.396 – DRILLED CAISSON CONSTRUCTION, 54” DIAMETER
L. T.397 – DRILLED CAISSON CONSTRUCTION, 60” DIAMETER
M. T.398 – REMOVAL OF EXISTING SIGN STRUCTURE
N. T.400 – DRILLED CAISSON CONSTRUCTION, 72” DIAMETER

T.373.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    3. PennDOT Publication 15, latest edition. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.
    4. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013. (For VMS Structures)

5. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition, 2001, including Interims through 2006. (For Static Structures)
6. AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002 with Interims through 2005.
7. Pennsylvania Turnpike Commission Standard Drawing PTS-740 – Monopipe Sign Structures for Static Panel.
8. Pennsylvania Turnpike Commission Standard Drawing PTS-750 – Monopipe Sign Structures for Dynamic Message Signs.
9. PennDOT Standard Drawing BC-745 (For supports and handholes and luminaires for static structures, and for hinged (collapsible) walkway handrails for VMS Structures).

T.373.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved.

T.373.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 948.2, Pennsylvania Turnpike Commission Standard Drawing PTS-740, Pennsylvania Turnpike Commission Standard Drawing PTS-750, the Contract Drawings, and as follows:

A. Paint. Provide a polyester powder coating or an epoxy/urethane paint over all galvanized structural steel including the vertical steel sign support members in accordance with the following:

Polyester Powder Coating – Hot-dipped galvanized parts are to be sent to the coater without passivation (no dichromate or quenched top layer). Galvanizing must be able to withstand an SP-7 blast without lifting and having an additional mil of zinc above the required specification to accommodate removal during blasting.

1. Brush blast parts to an SP-7 to remove oxidation and soils using steel grit.
2. Preheat parts to 150-250 degrees Fahrenheit.
3. Apply polyester powder to 5-10 mils.
4. Fully cure to manufacturer's recommendations.
5. Package for shipment.

OR

Epoxy/Urethane Paint –

1. Prepare surfaces to be painted in accordance with paint manufacturer's recommendations.
2. Apply polyamide epoxy primer to 2-3 mils dry, 4-6 mils wet.
3. Apply acrylic aliphatic urethane top coat to 4-6 mils dry, 6-10 wet.
4. Fully cure to manufacturer's recommendations.
5. Package for shipment.

OR

In accordance with PennDOT Publication 408/2016, Section 1060 using an approved three coat inorganic zinc system listed in PennDOT Publication 35 (Bulletin 15). Do not mix components or coats from different systems.

Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

Submit a color sample to the Engineer for approval prior to purchasing and coating application.

T.373.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Section 948.3, Pennsylvania Turnpike Commission Standard Drawing PTS-740, Pennsylvania Turnpike Commission Standard Drawing PTS-750, the Contract Drawings, and as follows:

Verify all dimensions in the field required to satisfactorily complete the work.

Shop coat/paint all structural components, including, but are not limited to monopipe tubes, sign supports, base plates, splice plates, stiffeners, shear plates, U-Bolts, walkways and walkway components.

Construct drilled caisson foundations as indicated and in accordance with PennDOT Publication 408/2016, Section 1006.3 and T.395 through T.397 and T.400 for Drilled Caisson Construction.

Welding to the columns for the walkway attachments is not permitted. Provide details for the walkway, grating, and connections in accordance with the Pennsylvania Turnpike Commission Standard Drawings as applicable, and handrail in accordance with PennDOT Standard Drawing BC-745M. Construct

walkway in accordance with VMS manufacturer's recommendations.

Sign structures indicated to have a walkway shall be furnished with an anti-skid walkway platform, and handrails to provide safe access to the access door in the end of the VMS. Provide hinged (collapsible) walkway handrails at VMS structures.

Provide required conduit sleeves internal to sign structure and communication cables and coordinate the installation of power and communication cables with the sign manufacturer and the Engineer.

Perform all work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and debris shields, as required.

Repair any damage to the shoulder or pavement resulting from the construction at no cost to the Authority.

Coordinate installation of power and communication cables and conduit, and CCTV cameras, Variable Message Signs (VMS), Lane Use Control Signals (LUCS), Variable Speed Limit Signs (VSLS) and luminaires, as required, with the applicable specifications, the product manufacturer (as applicable), the Engineer and the utility company(ies).

END OF SECTION

T.390 – T.391 STEEL SIGN STRUCTURE – TRUSS

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 390 STEEL SIGN STRUCTURE – TRUSS, S-8 (DSS-308)
ITEM 391 STEEL SIGN STRUCTURE – TRUSS, S-9 (DSS-309)

T.390.1 GENERAL

T.390.1.1 DESCRIPTION: This work is the furnishing and construction of overhead truss sign structures as indicated on the drawings and specified herein. This work includes the following sign structures:

Sign Structure S-8 (Static 4-Chord Truss Overhead Structure)
Sign Structure S-9 (Static 4 Chord Truss Overhead Structure)

T.390.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.247 – CCTV CAMERA SYSTEM, STRUCTURE MOUNT
D. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS
E. T.398 – REMOVAL OF EXISTING SIGN STRUCTURE

T.390.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PennDOT Publication 15, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

4. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition, 2001, including Interims through 2006.
5. AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002 with Interims through 2005.
6. PennDOT Standard Drawing BC-745M – Overhead Sign Structures (4 Post 4 Chord Truss Spans from 100' to 200')

T.390.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit detailed shop drawings to the Engineer for review and acceptance. Do not commence fabrication until the shop drawings are approved.

T.390.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 948.2, PennDOT Standard Drawing BC-745M, the Contract Drawings, and as follows:

A. Class AA Concrete – In accordance with PennDOT Publication 408/2016, Section 704.
B. Forms – In accordance with PennDOT Publication 408/2016, Section 1001.2(h).
C. Reinforcement Bars, Epoxy Coated – ASTM A615, Grade 60, in accordance with PennDOT Publication 408/2016, Section 1002.2.
D. Epoxy Bonding Compound – Type II, Grade 2, ASTM C 881 epoxy as specified in PennDOT Publication 408/2016, Section 706.
E. Epoxy Reinforcing Bar Patching Material – In accordance with PennDOT Publication 408/2016, Section 709.1.C.2.b and ASTM D3963.
F. Paint. Provide a polyester powder coating or an epoxy/urethane paint over all galvanized structural steel including the vertical steel sign support members in accordance with the following:

Polyester Powder Coating – Hot-dipped galvanized parts are to be sent to the coater without passivation (no dichromate or quenched top layer). Galvanizing must be able to withstand an SP-7 blast without lifting and having an additional mil of zinc above the required specification to accommodate removal during blasting.

1. Brush blast parts to an SP-7 to remove oxidation and soils using steel grit.
2. Preheat parts to 150-250 degrees Fahrenheit.

3. Apply polyester powder to 5-10 mils.
4. Fully cure to manufacturer's recommendations.
5. Package for shipment.

OR

Epoxy/Urethane Paint –

1. Prepare surfaces to be painted in accordance with paint manufacturer's recommendations.
2. Apply polyamide epoxy primer to 2-3 mils dry, 4-6 mils wet.
3. Apply acrylic aliphatic urethane top coat to 4-6 mils dry, 6-10 wet.
4. Fully cure to manufacturer's recommendations.
5. Package for shipment.

OR

In accordance with PennDOT Publication 408/2016, Section 1060 using an approved three coat inorganic zinc system listed in PennDOT Publication 35 (Bulletin 15). Do not mix components or coats from different systems.

Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

Submit a color sample to the Engineer for approval prior to purchasing and coating application.

T.390.3 **CONSTRUCTION –** In accordance with PennDOT Publication 408/2016, Sections 948.3, PennDOT Standard Drawing BC-745M, the Contract Drawings, and as follows:

Verify all dimensions in the field required to satisfactorily complete the work.

The top of the reconstructed sign structure support wall shall match the elevation of the top of the existing sign structure support wall. Verify elevation of top of existing sign support wall prior to starting work. If the suveyed elevation differs from the elevation indicated in the plans, submit survey information to the Engineer for review and adjustment of any associated sign structure demensions or details prior to developing shop drawings.

Install temporary signs to replace removed overhead sign structures S-8 and S-9. Temporary signs shall be designed in accordance with MUTCD standards and preferences within MUTCD Chapter 2E (size and style of letters is in section 2E.14) and the PennDOT Pub 11 TCs).

Construction of WB sign structure foundations and supports for S-8 and S-9 shall be completed in Stage 4. Implement long term shoulder closure in accordance with PennDOT Publication 213 PATA 502 for WB shoulder work.

Shop coat/paint all structural components.

Perform concrete work for the sign structure support wall reconstruction in accordance with PennDOT Publication 408/2018, Section 1001.3.

Maintain existing reinforcement bars as indicated. Place new reinforcement bars and splice to existing as indicated.

Do not damage any of the existing reinforcement which is to remain. Mechanically clean and coat with epoxy reinforcing bar patching material any exposed reinforcing steel which is to remain.

Exercise care so as not to damage existing conduits. See ITS Plans and Reference drawings for conduit details and locations. Repair any damage to existing conduits to remain to the satisfaction of the Engineer at no cost to the Authority.

Perform all work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and debris shields, as required.

Repair any damage caused to portions of the existing structure to remain to the satisfaction of the Engineer at no cost to the Authority.

Provide required conduit sleeves internal to sign structure and communication cables and coordinate the installation of power and communication cables with the sign manufacturer and the Engineer.

Coordinate installation of power and communication cables and conduit, and the CCTV camera with the applicable specifications, the product manufacturer (as applicable), the Engineer and the utility company(ies).

END OF SECTION

T.392 – T.394 STEEL SIGN STRUCTURE REPAIR

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 392 STEEL SIGN STRUCTURE REPAIR, S-2 (DSS-0302)
ITEM 393 STEEL SIGN STRUCTURE REPAIR, S-23 (DSS-0323)
ITEM 394 STEEL SIGN STRUCTURE REPAIR, S-24 (DSS-0324)

T.392.1 GENERAL

T.392.1.1 DESCRIPTION: This work is the cleaning, painting and repair of existing double strut and single mast arm cantilever sign structures. This work includes the following sign structures:

Sign Structure S-2 (Double Strut Cantilever Structure)
Sign Structure S-23 (Single Mast Arm Cantilever Structure)
Sign Structure S-24 (Single Mast Arm Cantilever Structure)

See Contract Drawings for details and locations of work.

T.392.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.136 – OVERHEAD SIGNAGE STRUCTURE – STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS
D. T.246 – LANE USE CONTROL SIGN SYSTEM, FRONT ACCESS
E. T.247 – CCTV CAMERA SYSTEM, STRUCTURE MOUNT
F. T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES
G. T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT
H. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS

T.392.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 35 (Bulletin 15), latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".

T.392.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit a color sample to the Engineer for approval prior to purchasing and coating application.

T.392.2 MATERIALS

A. Nuts and Washers – PennDOT Publication 408/2016, Section 1105.02(c)2. Galvanize nuts and washers in accordance with PennDOT Publication 408/2016, Section 1105.02 (s).
B. Paint. In accordance with T.370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES

   Provide a finish coat color of Walt Whitman Bridge Green, Federal Standard 595B Color No. 14223.

T.392.3 CONSTRUCTION

Verify all dimensions in the field required to satisfactorily complete the work.

Paint all structural components, including, but not limited to column, struts, base plates, stiffeners, U-Bolts, and miscellaneous attachments. Prepare and coat existing steel sufaces in accordance with T.370.

Provide worker protection and environmental management in accordance with T.371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Perform all work in accordance with the traffic staging indicated on the Traffic Control Plans.

Provide work platforms and debris shields, as required.

Repair any damage caused to portions of the existing structure to remain to the satisfaction of the Engineer at no cost to the Authority.

Install new CCTV Camera and Lane Use Control Signals (LUCS) in accordance

with the specifications and plans after all structural work has been completed so as to limit the potential for damage to the CCTV camera and the LUCS.

Remove and return to the Authority any requested lighting items or devices.

END OF SECTION

T.395 – T.397, T.400 DRILLED CAISSON CONSTRUCTION

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 395 DRILLED CAISSON CONSTRUCTION, 48" DIAMETER
ITEM 396 DRILLED CAISSON CONSTRUCTION, 54" DIAMETER
ITEM 397 DRILLED CAISSON CONSTRUCTION, 60" DIAMETER
ITEM 400 DRILLED CAISSON CONSTRUCTION, 72" DIAMETER

T.395.1 GENERAL

T.395.1.1 DESCRIPTION: This work is the construction of drilled piers (caissons) for new sign structures at locations indicated on the Contract Drawings.

T.395.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.373 – STEEL SIGN STRUCTURE - MONOPIPE S-1
D. T.374 – STEEL SIGN STRUCTURE - MONOPIPE S-3
E. T.375 – STEEL SIGN STRUCTURE - MONOPIPE S-4
F. T.376 – STEEL SIGN STRUCTURE - MONOPIPE S-5
G. T.377 – STEEL SIGN STRUCTURE - MONOPIPE S-6
H. T.378 – STEEL SIGN STRUCTURE - MONOPIPE S-10
I. T.379 – STEEL SIGN STRUCTURE - MONOPIPE S-11
J. T.380 – STEEL SIGN STRUCTURE - MONOPIPE S-13
K. T.381 – STEEL SIGN STRUCTURE - MONOPIPE S-14
L. T.382 – STEEL SIGN STRUCTURE - MONOPIPE S-15
M. T.383 – STEEL SIGN STRUCTURE - MONOPIPE S-16
N. T.384 – STEEL SIGN STRUCTURE - MONOPIPE S-17EB
O. T.385 – STEEL SIGN STRUCTURE - MONOPIPE S-17WB
P. T.386 – STEEL SIGN STRUCTURE - MONOPIPE S-18
Q. T.387 – STEEL SIGN STRUCTURE - MONOPIPE S-19
R. T.388 – STEEL SIGN STRUCTURE - MONOPIPE S-20
S. T.389 – STEEL SIGN STRUCTURE - MONOPIPE S-21
T. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS
U. T.401 – HEALTH AND SAFETY PLAN
V. T.402 – WASTE MANAGEMENT PLAN
W. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
X. T.404 – WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING
Y. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

Z. T.409 to T.410 – OFF-SITE DISPOSAL, LIQUIDS

T.395.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018~~408/2016, latest edition~~. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee", in particular Section 1006 – Drilled Caissons except as modified below.

T.395.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Do not commence fabrication until the shop drawings are approved.
C. Submit manufacturer product data for materials to be used to the Engineer for review and approval.
D. Submit Work Plan that includes at a minimum – construction methods, proposed slurry mixing and handling, and disposal procedures/ disposal facilities, consistent with Section T.401 through T.406.
E. Submit drill rig with pump details.

T.395.2 MATERIALS – In accordance with PennDOT Publication 408/2016, Section 1006.2 and as follows:

A. Concrete – As specified in Section 1006 – Drilled Caissons

B. Reinforcement Bars, Epoxy Coated – ASTM A615, Grade 60, in accordance with PennDOT Publication 408/2016, Section 1002.2.

C. Steel Casing – As per Section 1006.2 except that the minimum wall thickness shall be 0.5 inches and the minimum length shall be 10 feet (from top of ground surface), or greater, as required to maintain the stability of the drilled shaft prior to concrete placement. Provide holes in steel casing for sign structure conduits, as required. Deburr the interior circumference of the holes to a smooth finish to prevent rough/burred edges from damaging the conduits.

D. Slurry – provide Bentonite Slurry in accordance with Section 1006.3.a. It should be noted that various area of the site are impacted with benzene and various other contaminants as directed in the Erosion and Sediment Control application. Contractor should take environmental impacts into consideration when designing his slurry mix. The Contractor may substitute Polymer Slurry at his option. If a Polymer Slurry is proposed, the Contractor shall provide the same submittals as required for Bentonite Slurry. In addition to the specified submittals, the Contractor shall provide a Work Plan that includes at a minimum – construction methods, proposed slurry mixing and handling, and slurry disposal procedures/disposal facilities. If Polymer slurry is utilized, "shock" slurry prior to disposal in accordance with the manufactures recommendations. All disposal of spent slurry shall be in accordance with all state, local and federal regulations and Sections T.401 through T.406.

T.395.3 CONSTRUCTION – In accordance with PennDOT Publication 408/2016, Section 1006.3 and as follows:

T.395.3.1 GENERAL

Perform work in accordance with the traffic staging shown in the Traffic Control Plans.

Provide work platforms, as required to provide safe rig access.

T.395.3.2 DEWATERING

Considering the design of the caisson includes bearing on soil below the elevation of the groundwater, caisson excavation utilizing slurry methods will be required to mitigate the potential for heave or other disturbance of the bearing surface.

T.395.3.3 EXPLORATORY DRILLING

Section 1006.3.b Test Holes – eliminate

Section 1006.3.c Probe Holes - eliminate

Section 1006.3.d Exploratory Drilling – If performed, at Contractor's discretion, and at no additional cost to the Authority, samples shall be taken in accordance with the requirements of the Standard Penetration Test from the design bottom

elevation to a point equal to 3 caisson diameters below the proposed bottom elevation. Such sampling shall be continuous for the specified depth. Submit sampling results to the Engineer for review prior to commence of production drilling. Contractor may combine the exploratory drilling with environmental sampling required in Section T.403 (Excavation Sampling, Analysis and Reporting) to pre-characterize soil for re-sue or disposal in accordance with T.402 (Waste Management Plan).

T.395.3.4 CONCRETE PLACEMENT

Concrete shall be placed either by Tremie or Pumping method in accordance with the requirements of 1006.3.h.2 and/or 1006.3.h.3 respectively.

T.395.3.5 WASTE MANAGEMENT, CHARACTERIZATION AND DISPOSAL

Contractor shall follow Sections T.401 through T.406 for waste management, characterization and disposal requirements.

END OF SECTION

T.398 REMOVAL OF EXISTING SIGN STRUCTURE

T.398.1 GENERAL

T.398.1.1 DESCRIPTION: This work is the removal of existing sign structures S-1, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-18, S-19, S-20 and S-21.

T.398.1.2 RELATED SECTIONS

A. T.3 – FIELD SURVEY AND ENGINEERING
B. T.6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION
C. T.26 – CLASS 2 EXCAVATION
D. T.28 – TOPSOIL, FURNISHED AND PLACED
E. T.29 – FOREIGN BORROW EXCAVATION
F. T.212 – SEEDING AND SOIL SUPPLEMENTS FORMULA L
G. T.372 – WORK PLATFORMS AND PROTECTION SHIELDS
H. T.373 – T.389 – STEEL SIGN STRUCTURE - MONOPIPE
I. T.390 – T391 – STEEL SIGN STRUCTURE – TRUSS
J. T.401 – HEALTH AND SAFETY PLAN
K. T.402 – WASTE MANAGEMENT PLAN
L. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
M. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.398.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the “Department” shall be interpreted to mean “the Authority” or its “Designee”.

T.398.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 of the General Provisions.
B. Submit a plan for demolition and removal of the sign structure, in accordance with PennDOT Publication 408/2016, Section 1018.3, sealed by a Professional Engineer registered in the Commonwealth of Pennsylvania, to the Engineer for approval.

T.398.2 **MATERIALS** - In accordance with PennDOT Publication 408/2016, Section 1018.2.

T.398.3 **CONSTRUCTION** - In accordance with PennDOT Publication 408/2016, Section 1018.3 and as follows:

Verify all dimensions in the field required to satisfactorily complete the work.

Excavate, as required, in accordance with PennDOT Publication 408/2016, Section 204 for Class 2 Excavations. Lay back (slope) excavations in accordance with OSHA regulations or provide temporary excavation support. Provide work platforms and protection shields, as required.

Management of any excavated material shall be in accordance with T.401 – HEALTH AND SAFETY PLAN, T.402 – WASTE MANAGEMENT PLAN, T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING and T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS.

Fill shall be in accordance with T.29 – FOREIGN BORROW EXCAVATION.

Topsoil shall be in accordance with T.28 – TOPOSOIL, FURNISHED AND PLACED.

Remove existing sign structure steel superstructure, concrete foundations or concrete wall pedestals to limits indicated, and all signs, attachments and other appurtenances.

Blasting is not permitted.

Repair or replace any portion of the structure damaged beyond the limits designated for removal at no additional cost to the Authority.

For structures with existing ITS and lighting devices, identify with the Engineer any devices or items which need to be carefully removed and returned to the Authority prior to demolition.

Satisfactorily dispose of all demolished materials resulting from the work.

Perform work in accordance with traffic staging indicated in the Traffic Control Plans. Coordinate the removal operations, as required, with temporary traffic restrictions (Complete Roadway Closure).

Sign structure removal limits are as follows:

For existing sign structures S-1, S-3, S-4, S-7, S-10, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-18, S-19, S-20 & S-21: Remove existing concrete foundation pedestals to the level of the top of the existing footing. The single pedestal foundations of cantilever sign structure S-3 and the south pedestal foundation of sign structure S-18 are located within roadway median barrier.

For existing sign structure S-5: Remove existing south side concrete foundation pedestal to the level of the top of the existing footing. Do not remove (maintain in place) the existing north side concrete foundation pedestal which is doweled into an adjacent retaining wall.

For existing sign structure S-6: Remove existing south side concrete foundation pedestal to the level of the top of the existing footing. Do not remove (maintain in place) the existing north side concrete foundation pedestal which is doweled into an adjacent retaining wall.

For existing sign structures S-8 and S-9: Remove existing sign structure support walls to the limits indicated on the Contract Drawings.

The following additional sign structure removal requirements pertain to sign structure support wall mounted Sign Structures S-8 and S-9:

Maintain existing reinforcement bars as indicated.

Do not damage any of the existing reinforcement which is to remain.

Saw cut a neat line prior to impact tool removal of existing concrete.

Do not operate pneumatic hammers or mechanical chipping tools at an angle in excess of 45 degrees relative to the surface of the concrete.

Do not place pneumatic tools in direct contact with reinforcing steel that is to remain.

Use hand tools such as hammers and chisels, or small air chisels to remove final particles of unsound concrete or to provide necessary clearances around reinforcement bars.

Exercise care so as not to damage the electrical and other conduits located within the existing sign structure support walls. See ITS Plans and Reference drawings for conduit details and locations. Repair any damage to existing conduits to remain to the satisfaction of the Engineer at no cost to the Authority.

END OF SECTION

T.399 CSX COORDINATION

T.399.1 GENERAL

T.399.1.1 DESCRIPTION

The Contractor is responsible for coordination with the CSX Transportation (CSX) for work to be performed adjacent to the railroad facilities. The Contractor shall secure permission from and comply with the regulations of the agency having jurisdiction over the rail line, plus provide the necessary level of insurance required. The Contractor is responsible for all fees associated with flag protection, electrical personnel, construction monitoring representatives and construction reviews (means and methods, containment installation plan, emergency action plan, paint application and surface prep submission, etc.). In addition to the above, it is the Contractor's responsibility to enter into a design services agreement and a construction services agreement as required by CSX for the successful completion of the work required in this Contract.

T.399.1.2 RELATED SECTIONS

A. T.321 – APPLICATION OF ANTI-GRAFFITI COATING
B. T.322 – REINFORCED CONCRETE REPAIR – TYPE 1
C. T.323 – REINFORCED CONCRETE REPAIR – TYPE 2
D. T.324 – REINFORCED CONCRETE REPAIR – TYPE 3
E. T.325 – EPOXY INJECTION CRACK REPAIR
F. T.332 – JOINT SEALING, SUBSTRUCTURE
G. T.338 – CLEAN DRAINAGE SYSTEM, CSX RAILROAD OVERPASS
H. T.341 – REPLACE ROOF DRAIN, CSX RAILROAD OVERPASS
I. T.344 – DEBRIS REMOVAL
J. T.365 – SPECIAL MORTAR REPAIRS

T.399.1.3 STANDARDS

A. Specific Requirements of CSX's Public Project Information Manual for Construction and Improvement Projects That May Involve the Railroad

T.399.1.4 SUBMITTALS

Make submittals to the Authority and CSX. Submittals are as required by CSX and include, but are not limited to the following:

A. Emergency Action Plan (EAP),
B. Site Access Plan and material staging
C. Protective shielding design calculations and material properties

D. Construction means and methods
E. Construction schedule

T.399.2 EXECUTION

With respect to CSX facilities, the Contractor shall obtain specific requirements and necessary permit(s) from CSX and conduct his work in conformance with applicable requirements and permit(s) as defined herein and as required by CSX.

Derek S. Mihaly, PE
Project Manager
CSX Transportation
4 Neshaminy Interplex, Suite 205
Trevose, PA 19053
(215) 218-3391
https://www.csx.com/

See CSX website for additional information, including insurance requirements. The Contractor will obtain verification of the time and schedule of track occupancy from the railroad(s) before proceeding with any construction or demolition work over, under, within, or adjacent to the railroad right-of-way. The Contractor shall submit for the approval of each railroad, plans and a detailed description of the methods which will be followed for work within these areas. The work in the field shall not proceed until the plans and method of procedure have been approved by the railroad.

The Contractor shall give not less than twenty-one days advance written notice to the official designated by the railroad to receive such notice, prior to the commencement of any work or any portion of the work by the Contractor or his subcontractors over or adjacent to the railroad's right-of-way.

If deemed necessary, the railroad(s) may furnish or assign inspectors or other personnel who will be assigned to the project during the time the Contractor or any subcontractor is performing work under the Contract on railroad property. The cost of these personnel will be paid directly by the Contractor to the railroad.

When railroad employees are assigned to protection duties during the time work is being performed on or adjacent to railroad right-of-way or facilities, the wages of said employees will include the base rate, warranted overtime, and labor surcharges in accordance with CSX's Public Project Information Manual.

The Contractor for this project is ultimately responsible for assuring that its agents, consultants, contractors, and sub-contractors fully comply with the

specifications contained herein. The term “sponsor” used throughout the specifications shall mean the Contractor, its agents, consultants, contractors, sub-contractors, etc.

The Contractor shall pay directly to the railroad charges by the railroad for protective services performed to ensure safe operations of trains when the work required by the Contractor under this Contract would, in the railroad’s opinion, be a hazard to railroad operations. To ensure Contractor payment of all charges made by the railroad, the Contractor shall submit evidence of payment in the form of copies of receipts with proof of payment, to the Engineer, prior to final payment of the Contract by the Authority.

END OF SECTION

T.401 HEALTH AND SAFETY PLAN

T.401.1 GENERAL

T.401.1.1 DESCRIPTION: This work is the preparation, training, implementation, enforcement, maintenance, and revision, as required, for a site-specific Health and Safety Plan (HASP) to ensure adequate protection of on-site personnel and the general public against exposure to identified contaminants during all materials handling activities/operations.

T.401.1.2 RELATED SECTIONS

A. T.402 – WASTE MANAGEMENT PLAN
B. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
C. T.404 – WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS
E. T.409 to T.410 – OFF-SITE DISPOSAL, LIQUIDS

T.401.1.3 STANDARDS

A. All work under this section shall comply with the latest edition of applicable laws, regulations, guidance, provisions and recommendations, including, but not necessarily limited to those listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
    2. 29 CFR Part 1926 – Safety and Health Regulations for Construction, and
    3. National Institute for Occupational Safety and Health (NIOSH),
    4. US Environmental Protection Agency (USEPA), and other applicable Federal, State, and local rules and regulations.

T.401.1.4 SUBMITTALS

A. Submittals shall be in accordance with T.401.3 below.

T.401.2 MATERIALS - Chemical analyses of groundwater suitable for the preparation of the HASP is included in the environmental due diligence documents provided to the Contractor. Assumed soil contaminants and concentrations may be utilized for the initial HASP which can later be refined as necessary based on sample collection and analysis.

Aside from noting the likely presence of historic fill throughout the project area and providing available case files obtained during the project design phase, no additional environmental due diligence information is being provided to the Contractor. In developing and updating the HASP the Contractor is required to engage qualified environmental professionals and health and safety professionals (CIH or CSP, as defined in T.401.3 below) to obtain, review and incorporate the most recent contaminant plume and sampling data into the HASP and any subsequent updates to the HASP.

T.401.3 **CONSTRUCTION** - Prior to the start of construction prepare and submit a site-specific HASP to the Engineer for acceptance

Establish and update the HASP to address the activities and conditions described in the accompanying Waste Management Plan (Section 402) to ensure adequate protection of on-site personnel and the general public against exposure to identified contaminants during all materials handling activities/operations. Submit the HASP to the Engineer for review, comment and acceptance. Do not begin any material handling activities including, but not limited to, excavation, demolition, handling, sampling/testing, screening, stockpiling of soil, drilling of caissons, or other known or suspected contaminated materials disturbance until acceptance of the HASP or amendments/updates by the Engineer and implementation of the controls established therein. HASP acceptance does not relieve the Contractor of liability for protection of health and safety of on-site personnel and the general public.

Assign a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP) to develop and oversee implementation of the HASP. Have the CIH/CSP review the due diligence information specific to the work area and address the proposed activities to the level of detail necessary to ensure that site specific data, appropriate regulations, and procedures that monitor for and protect against release and exposure to site contaminants are incorporated. The CIH/CSP will be onsite to oversee HASP implementation during initiation of each new activity, as defined in the WMP, to assure measures required to protect and monitor onsite workers and the general public are implemented and effective.

Ensure that the CIH/CSP reviews site-specific data and addresses the proposed activities to the level of detail needed to ensure that site-specific data, appropriate regulations, and a description of the site conditions are incorporated into the Site-Specific HASP.

Describe workplace and emergency procedures so that the Project is constructed in a safe manner. The Site-Specific HASP shall govern all facets of the Project

and encompass the activities of all persons who enter or work on the Project. Incorporate procedures that conform to Federal, State, and local laws, rules, and regulations pertaining to employee working conditions where appropriate, National Institute for Occupational Safety and Health, OSHA, USCG, EPA, and PADEP.

Due to the nature of the petroleum plume contaminants, the potential exists for ignition hazards related to the borehole excavations, as well as soil, slurry and/or liquid waste management and containment measures. Measures to monitor for and mitigate potential ignition hazards shall be addressed in the Site-Specific HASP.

Comply with all the requirements of the accepted HASP during the demolition, excavation, handling, and stockpiling, testing, on-site and off-site transportation, disposal and/or recycling, treatment, containment, discharge, or other work conducted where exposure to contaminated materials may occur.

Provide that the CIH/CSP or health and safety designee evaluate the scope of and implement air monitoring as necessary to demonstrate compliance with the HASP exposure and protection criteria during work efforts that disturb/mobilize soil materials or for construction materials that occur in proximity or in identified areas of the project site including, but not limited to: abatement, demolition, excavation, grading, haul road use, clean and contaminated soil stockpile maintenance and loading operations, and identify mitigation, as necessary, to limit exposure to workers and the general public. Include in the HASP applicable training and qualification documentation for each health and safety designee.

Provide initial, annual, and post-project training and medical monitoring in accordance with OSHA 29 CFR 1910 for all on-site personnel scheduled to work within the project limits, or be exposed to identified contaminants. At the Engineer's request, up to ten (10) DRPA employees and/or their authorized representatives will receive the same training, to consist of two (2) hours of awareness training concerning site environmental conditions, personnel monitoring and personnel protection equipment (PPE), and medical monitoring. The initial training for the Engineer's personnel and/or their authorized representatives will be provided at least one month prior to any excavation.

Maintain a copy of the accepted HASP and all accepted amendments on site during all contaminated materials handling activities. Maintain copies of site monitoring performed during excavation, demolition or other contaminated materials handling. Maintain copies of equipment calibrations. Maintain on site all documentation of the safety briefings, work monitoring, records, calibration,

and notations. Provide copies of these documents to the Engineer upon request.

Amend, as necessary, the HASP to address work elements or site conditions not included in the original HASP. Conduct safety briefings prior to implementing new areas of work or methods and notify the Engineer or representative of such briefings.

END OF SECTION

T.402 WASTE MANAGEMENT PLAN

T.402.1 GENERAL

T.402.1.1 DESCRIPTION: This work is the preparation, submission, revision and implementation of a project-specific Waste Management Plan (WMP) to be followed for Clean Fill, Regulated Fill, Residual Waste and Hazardous Waste, including soil, water and drilling slurry laboratory analytical characterization/classification, excavation/dewatering, staging/containment, permitting, transportation, disposal, documentation and reporting.

The waste subject to this specification is expected to be associated with: (1) historic fill which was likely used to raise the elevation of the land throughout the project area, and/or (2) a known plume of petroleum contamination in portions of the project corridor expected to be encountered during installation of foundations for sign structures S-3, S-4 and S-5.

Aside from noting the likely presence of historic fill throughout the project area and providing available case files obtained during the project design phase, no additional environmental due diligence information is being provided to the Contractor. In developing and updating the WMP the Contractor is required to engage qualified environmental professionals to obtain, review and incorporate the most recent contaminant plume data into the WMP and any subsequent updates to the WMP.

T.402.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
C. T.404 – WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS
E. T.409 to T.410 – OFF-SITE DISPOSAL, LIQUIDS

T.402.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest edition of applicable laws, regulations, guidance, provisions and recommendations, including, but not necessarily limited to those listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 281/2012, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. PADEP Management of Fill, Document 258-2182-773
4. 25 Pa. Code Chapters 287 to 299 (residual waste regulations)
5. 25 Pa. Code Chapters 271 to 285 (municipal waste regulations)
6. Solid Waste Management Act, 35 P.S. §§ 6018.101 et seq.
7. Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 et seq.
8. 40 CFR 262, and Pennsylvania Title 25, Chapters 260-270

T.402.1.4 SUBMITTALS

A. Submittals shall be in accordance with T.402.3 below.

T.402.2 MATERIALS - In accordance with T.402.3 below.

T.402.3 CONSTRUCTION - Prior to the start of construction prepare and submit a WMP to the Engineer for review and acceptance pursuant to the Standards indicated above. Contractor implementation of the WMP will be subject to inspection by the Engineer's environmental inspector, as required by the Engineer. Update the WMP with approval of the Engineer and as necessary to address any changes in work conditions.

The WMP will demonstrate understanding of the transportation construction project, understanding of the environmental characterization of the planned project area and an understanding of the actual and potential waste impacts to transportation project features. The WMP will identify the means, methods, procedures and actions to properly move, stage, contain, sample, test, remediate/abate, treat, dispose, and/or otherwise handle, including beneficial reuse within the construction right-of-way (ROW), soil, groundwater, drilling slurry or other contaminated media as required to construct the project.

The WMP will consist of the following principal elements, as applicable, pursuant to the transportation project requirements, the nature and extent of environmental impact and the guidance, standards and regulations referenced herein or additionally applicable to:

- Summary of the transportation construction project scope of work
- Summary of the environmental characterization of the project study area

- Definitions and responsibilities
- Summary of the scope of the WMP
- Sampling and analysis procedures for all media
- Quality assurance procedures
- Waste containment, pre-treatment, storage/staging and handling procedures
- Identification and qualifications of licensed waste transporters
- Proposed routes to receiving facilities and weighing facilities.
- Proposed disposal facilities and requirements of the facilities to accept the regulated material as well as copies of disposal facilities certifications and permits.
- A list of permitted alternative disposal facilities to be utilized in the event the approved facility ceases to accept waste materials generated under this Contract.
- Summary of all required permits, application procedures, compliance monitoring and reporting
- Procedures for site controls, decontamination and dust control procedures
- Procedures for site monitoring
- Required signage and site security
- Project waste generation and handling schedule, specifying how these actions are integrated into the construction schedule
- Documentation and reporting procedures, including permits, forms, evidence of training licenses/certifications, manifests submittals, approvals, reports, photographic documentation, etc.
- Procedures for demobilization and closeout of waste handling

The WMP will concisely summarize the transportation construction project scope of work, noting particular construction elements where Clean Fill, Regulated Fill, Residual Waste and Hazardous Waste handling will occur, as required, based on the Contractor's review of available environmental case file information.

The WMP will define roles and responsibilities for all Contractor personnel involved in waste management. Personnel will be properly trained in waste handling in accordance with the requirements of the site-specific health and safety plan (HASP) associated with Section T.401.

The WMP will provide sampling and analysis approaches for soil, groundwater, dewatering or decontamination waste water and drilling slurry that address collection methodology, equipment, quality assurance/quality control (QA/QC), analytical methods, data evaluation and reporting. The WMP will establish when and how soils, groundwater, drilling slurry, dewatering waste,

decontamination waste and/or other waste will be screened and sampled, in-place and/or from staged containment, and how these samples will be analyzed for characterization and/or classification purposes for determination of onsite reuse (Section T.30) or offsite disposal (Sections T.405 to T.407 and Sections T.408 to T.409).

The sampling approach must be approved by the Engineer prior to sample collection. Any analytical data, findings and/or interpretation submitted by the Contractor for samples collected without the Engineer's approval may be rejected by the Engineer.

In order to make a final determination of soil condition for onsite reuse or offsite disposal, this specification, as well as Section T.403, Sampling, Analysis and Reporting, requires the Contractor to engage qualified environmental professionals to sample soils in-situ, prior to excavation, as environmental due diligence information suggests that soils throughout the project area might classify as Regulated, Residual Waste or Hazardous Waste.

The WMP will identify all applicable solid and liquid waste handling procedures for the duration of the project. The WMP will specify the means and methods of regulated soil excavation, any necessary excavation dewatering, onsite transportation, interim staging and stockpiling, secondary containment, erosion and sedimentation controls, contaminant leaching, odor and dust controls, manifesting, handling and transportation for offsite disposal.

The WMP will identify temporary staging areas on a suitably scaled plan for each of the classified soil types Clean Fill, Regulated Fill, Residual Waste and Hazardous Waste in the project ROW to prevent mixing and optimize appropriate reuse in the project ROW.

The WMP will identify all waste manifesting, transportation and disposal methods. All transportation and disposal of waste in Pennsylvania will be in accordance with Pennsylvania Title 25, Chapters 271, 273, 279, and 285 for the handling, packaging, and storage of Residual and Municipal construction non-hazardous waste and 40 CFR 262, and Pennsylvania Title 25, Chapters 260-270 for the on-site handling, packaging, storage and transportation of all hazardous waste generated by the project. Non-hazardous and hazardous soils exported for disposal in New Jersey must be transported and disposed of in accordance with N.J.A.C 7:26 Subchapters 2.0, 3.0, 4.0 and 16.0 and N.J.A.C 7:26G.

The WMP will identify all applications, permits, manifests, bills of lading and other applicable documents required to export and dispose offsite excess waste generated during the project. The WMP will identify all permits required to

handle, transport and dispose of all wastes generated during the project and Contractor will be responsible for maintaining all permits to avoid expiration.

The WMP will identify all waste transporters to be used on the project and will provide supporting credentials, including licenses, permits and certifications. Each transporter will be qualified and licensed to transport the selected waste type. The transporter will adhere to all over-the-road requirements, including all required placarding and signage in accordance with all applicable federal, state and local regulations. All disposal facilities will be identified in the WMP, with supporting credentials, permits, licenses and certifications. In the event a new transport or disposal firm is required after the WMP is approved, the Contractor must submit the proposed transporter and/or disposal firm name, address, point of contact and credentials to the Engineer no less than 15 working days prior to use, to afford Engineer time to review and approve.

The WMP will present all necessary procedures for site controls, decontamination, dust and odor control as related to waste handling and disposal. Staged soils will be covered, as required by odor, dust prevention and contaminant impact or further controlled for erosion and sedimentation (E&S) purposes in accordance with the associated National Pollutant Discharge Elimination System (NPDES) permit and E&S procedures. The WMP will identify any required waste handling monitoring. Monitoring for worker safety will be in accordance with the associated HASP.

If during the course of construction the Contractor excavates soils that they believe present an unforeseen environmental condition and/or are in contrast to Contractor completed sampling and analysis in accordance with Section T.403, the Contractor will immediately notify the Engineer or their authorized environmental field inspector to allow Engineer inspection of the situation. Contractor may continue to excavate soils as required and capable in accordance with the HASP and WMP, or cease excavation until acceptable alternatives are determined, as agreed to between the Contractor and the Engineer, but with the Engineer making the final determination. If soil excavation continues after Engineer's notification and inspection, soils must be segregated, staged, stored and covered according to procedures identified in the WMP until soils can be classified for onsite reuse/offsite disposal in accordance with T.30 and/or T.405 to T.408.

The WMP shall incorporate the following specific requirements, which may be modified only with written consent of the Engineer:

1. Temporarily store regulated material in containers and/or stockpiles within the project limits in areas selected by the Contractor and approved by the Engineer. Cuttings generated from drilled caisson construction for

sign structures S-3, S-4, and S-5 should be placed into covered roll-off containers. Avoid stockpiling of soil materials associated with the petroleum plume unless approved by the Engineer. In the event of temporary stockpiling, construct stockpiles on polyethylene sheeting. Contain stockpiles with compost filter socks, haybales or silt fence placed continuously at the perimeter of the stockpiles. Cover stockpiles with polyethylene sheeting. Secure the cover in place at all times. Overlap joints in the polyethylene sheeting a minimum of 12 inches, and place securing materials along the joints. Maintain the cover, and replace damaged polyethylene sheeting as needed.

2. It is preferable to excavate and place pre-characterized soils directly into roll-off containers or trucks for transportation to the approved disposal facility. If soil material is not designated for reuse on-site, dispose of all Regulated, Residual Waste or Hazardous Waste within 90 days of being containerized or stockpiled, unless otherwise authorized by the Engineer. Do not reuse soil, slurry or other regulated material associated with installation of foundations for sign structures S-3, S-4 or S-5, which are expected to have been impacted by the petroleum plume. Dispose of this material within 90 days of being generated.
3. Do not mix wastes of different types (i.e., slurry with soils) and do not mix wastes generated during general excavation with those from drilled caisson construction for sign structures S-3, S-4, and S-5 (or any other potentially contaminated area). All waste streams must be appropriately segregated, tracked and disposed.
4. Regulated Fill will be placed in all areas where it meets design structural requirements and where Clean Fill is not required. The preferential order of soil reuse, according to design, will be as follows: Regulated Fill then Clean Fill.
5. The Contractor is advised that the stockpiling/staging of regulated materials at unauthorized locations or facilities is strictly prohibited, even if the permission of the property or facility owner is obtained. Any violation of this restriction by the Contractor or any person employed by the Contractor will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties.
6. The Contractor is advised that no soils excavated from the project area shall be exported for use on other projects/sites or used as fill in public access areas. All excess soil material must be disposed in accordance with Section T.405 to T.408.
7. Clean equipment used for the movement of excavated material at the end of each working day or before removing it from the project limits. Install non-vegetative erosion control features to limit the movement of the excavated material from equipment cleaning areas. Temporarily store

the excavated material from equipment cleaning areas in containers or covered stockpiles.

The Contractor shall not deviate from the approved WMP without written approval by the Engineer. The WMP will contain a project schedule, integrated into the construction schedule, that identifies the general progression of waste generation according to the Design phasing and staging. The schedule will facilitate Engineer's environmental inspection, as required.

The Contractor shall continuously monitor the quantity of waste generated, contained, collected, stored and disposed of. The Contractor's records shall be kept current and be available on site at all times. Submit weekly reports to the Engineer to track and document the excavation, stockpiling, sampling, off-site management, and on-site placement of Clean Fill, Regulated Fill, Residual Waste and Hazardous Waste. Indicate, on scaled site plans, the location and dates of excavation, stockpiling, sampling, off-site disposal, and on-site placement of any re-used material. Explain changes to or variations from the WMP. Additionally, include dates of planned excavation, sampling, and disposal of regulated material for the coming months.

At the conclusion of the project, prepare and submit a Final Report for review and acceptance by the Engineer. Include within the report a summary of the methods and results of characterization and classification sampling, locations of all samples and locations/depths of reused soil within the corridor, as well as complete and organized disposal information for all media. The Final Report will have official analytical results for all sampling events in electronic format, as well letters of facility acceptance, weight tickets, bills of lading, manifests and other documentation of disposal for all waste (solid and liquid). Submit four (4) paper copies and one (1) digital copy in portable electronic format (PDF) of the accepted Final Report to the Representative within 30 days of the completing physical work at the project site.

Both the weekly and final reports shall contain: results of Clean Fill, Regulated Fill, Residual Waste and Non-Hazardous/Hazardous Waste determinations in accordance with Sections T.403 and T.404, permits, forms, approvals, safety briefings, official laboratory analytical results and chain of custody documentation, calculations of water/soil treatment and disposal volumes, facility acceptance documentation and weight tickets.

END OF SECTION

T.403 EXCAVATION SAMPLING, ANALYSIS AND REPORTING

T.403.1 GENERAL

T.403.1.1 DESCRIPTION: This work consists of sampling, laboratory analysis, characterization and classification of in-place soils in planned Class 1a, 2, 3 and 4 excavations, in planned drilled caisson locations, and in planned trench and backfill as well as horizontal boring locations. This work will require the Contractor to determine: 1) soil reuse within the project right-of-way (ROW) in accordance with the Pennsylvania Department of Environmental Protection's (PADEP) Management of Fill Policy (MoFP), and 2) offsite disposal under Section T.405 to T.407, Off-Site Disposal, Solids.

T.403.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.404 – WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.407 – OFF-SITE DISPOSAL, SOLIDS
E. T.408 to T.409 – OFF-SITE DISPOSAL, LIQUIDS

T.403.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest edition of applicable laws, regulations, guidance, provisions and recommendations, including, but not necessarily limited to those listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 281/2012, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PADEP Management of Fill, Document 258-2182-773
    4. 25 Pa. Code Chapters 287 to 299 (residual waste regulations)
    5. 25 Pa. Code Chapters 271 to 285 (municipal waste regulations)
    6. Solid Waste Management Act, 35 P.S. §§ 6018.101 et seq.
    7. Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 et seq.
    8. 40 CFR 261 Appendix I – Engineer Sampling Methods (SW 846, September 1986)

T.403.1.4 SUBMITTALS

A. Submittals shall be in accordance with T.403.3 below.

T.403.2 **MATERIALS** - In accordance with T.403.3 below.

T.403.3 **CONSTRUCTION** – In order to make a final determination of soil condition for onsite reuse or offsite disposal, this specification, as well as Section T.402, Waste Management Plan, requires the Contractor to engage qualified environmental professionals to sample soils in-situ, prior to excavation, as environmental due diligence information suggests that soils throughout the project area might classify as Regulated Fill, Residual Waste or Hazardous Waste.

Provide adequately trained and experienced personnel along with traffic control, equipment, materials and laboratory analytical services to complete this work in accordance with all applicable standards and regulations and consistent with all related sections detailed herein. Collect and laboratory analyze samples from all construction-required excavation areas in accordance with the Management of Fill Policy, Appendix A and SW-846.

Contractor will design the sampling approach to characterize and classify soils in planned excavations and will provide a written Sampling Plan for the Engineer's review and acceptance. The Sampling Plan will include:

- Scaled sample location plan(s) identifying the proposed soil sample locations and depths,
- Description of sampling equipment and methods,
- Sample naming convention,
- Laboratory analytical parameters,
- Quality assurance/quality control (QA/QC) sampling required to support the field samples in accordance with SW-846,
- Sample equipment decontamination procedures,
- Investigation derived waste (IDW) disposal procedures, and
- Borehole abandonment procedures.

Sample locations will be recorded according to NAD 1983 PA State Plane Feet South datum via a hand held digital global positioning system accurate to <1 meter. A lithologic log for each sample location will be prepared, noting sample lithology and sample depth.
Contractor implementation of field sampling will be subject to Engineer's authorized environmental inspection and split sampling, at the request of the Engineer. Any analytical data, findings and/or interpretation submitted by the Contractor for samples collected from the project ROW without the Engineer's approval may be rejected by the Engineer.

Should the need arise to sample stockpiled or containerized material, all applicable requirements of this Section and all related Section shall remain; and the work must be conducted in accordance with T.403.1.3 and with the review, inspection and approval of the Engineer.

Performance of this work will require traffic control. Perform traffic control in accordance with Section T.6 (Maintenance and Protection of Traffic During Construction) and any costs for traffic control required for this work shall be incidental to Section T.6.

Once the sampling approach in the WMP is approved, it will be implemented according to the schedule provided in the WMP. Sampling will be performed in one mobilization prior to construction or in a phased manner during the course of construction prior to a specific excavation or planned phase of excavation(s). If sampling is phased, Contractor will expedite laboratory turn-around of results to optimize and/or not interfere with the forward progress of the construction schedule. Contractor will notify Engineer a minimum of ten (10) working days in advance of a mobilization to allow adequate time for scheduling inspection.

Prepare a Results Report documenting the sampling and analysis in accordance with procedures, format and schedule identified in the WMP. If sample collection will be phased, report each phase separately, tabulating analytical results with applicable standard(s) such as: Management of Fill Policy Clean Fill standards (Tables FP-1a/b), Regulated Fill standards (Tables GP-1a/b) and Act 2 applicable nonresidential standards. Include a sample location map depicting soil quality in a suitable manner, identifying the classification and volume of classified soils represented by a sample/set of samples in a planned excavation as Clean Fill, Regulated Fill, Residual Waste and Hazardous Waste. Include recommendations for soil reuse and offsite disposal, accordingly, in accordance with the WMP.

All Results Reports will contain Official analytical data reports from the Contractor selected laboratory(s), which will be forwarded to the Engineer in electronic format according to US EPA's laboratory Electronic Data Deliverable Region V (LEDD Region V) format. Submit the Report in draft and final form to the Engineer according to the schedule in the WMP. No soil excavation may proceed until the Results Report is approved by the Engineer.

All sampling will be performed by personnel experienced with environmental soil sampling and geological material description. Retain laboratories certified to perform analyses using EPA-approved methods that possess registration or accreditation by the Pennsylvania Laboratory Accreditation Program (PLAP). Perform personnel protection, decontamination, and contaminant screening consistent with the requirements of the accepted HASP (SectionT.401).

END OF SECTION

T.404 WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING

T.404.1 GENERAL

T.404.1.1 DESCRIPTION: This work consists of sampling, laboratory analysis, and classification of liquid waste, including, but not necessarily limited to dewatering waste, drilling slurry and decontamination waste water. This work will allow the Contractor to determine offsite disposal under Section T.408 to T.409, Off-Site Disposal, liquids.

T.404.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS
E. T.409 to T.410 – OFF-SITE DISPOSAL, LIQUIDS

T.404.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest edition of applicable laws, regulations, guidance, provisions and recommendations, including, but not necessarily limited to those listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

    1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    2. PennDOT Publication 281/2012, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
    3. PADEP Management of Fill, Document 258-2182-773
    4. 25 Pa. Code Chapters 287 to 299 (residual waste regulations)
    5. 25 Pa. Code Chapters 271 to 285 (municipal waste regulations)
    6. Solid Waste Management Act, 35 P.S. §§ 6018.101 et seq.
    7. Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 et seq.

T.404.1.4 SUBMITTALS

A. Submittals shall be in accordance with T.404.3 below.

T.404.2 **MATERIALS** - In accordance with T.404.3 below.

T.404.3 **CONSTRUCTION** – In order to make a final determination of water and slurry classification for disposal, this specification, as well as Section T.402, Waste Management Plan, requires the Contractor to engage qualified environmental professionals to sample water and slurry prior to disposal, as environmental due diligence information indicate that groundwater beneath a portion of the project area is contaminated with various petroleum hydrocarbons and metals.

Provide adequately trained and experienced personnel along with traffic control, equipment, materials and laboratory analytical services to complete this work in accordance with all applicable standards and regulations and consistent with all related sections detailed herein. Collect and laboratory analyze samples of containerized water and slurry/water mixtures to characterize the material for disposal.

Contractor will design the general sampling approach in the WMP and then provide the specific sampling requirements in a concise written Liquid/Slurry Sampling Plan for the Engineer's review and acceptance prior to sampling. The Liquid/Slurry Sampling Plan will include:

- An inventory of the material to be classified, including a description of container(s), and the material and source of the material contained in each,
- Laboratory analytical parameters,
- Quality assurance/quality control (QA/QC) sampling required to support the field samples,
- Sample equipment decontamination procedures, and
- Investigation derived waste (IDW) disposal procedures.

Contractor implementation of field sampling will be subject to Engineer's authorized environmental inspection and confirmatory sampling, at the request of the Engineer.

The sampling approach must be approved by the Engineer prior to sample collection. Any analytical data, findings and/or interpretation submitted by the Contractor for samples collected without the Engineer's approval may be rejected by the Engineer.

Performance of this work will require traffic control. Perform traffic control in accordance with Section T.6 (Maintenance and Protection of Traffic During Construction) and any costs for traffic control required for this work shall be incidental to Section T.6.

Once the sampling approach in the Liquid/Slurry Sampling Plan is approved, it will be implemented according to the schedule provided in the WMP. Sampling of liquid and slurry media will be performed in a phased manner during the course of construction as liquids and slurry are generated for disposal. Contractor will expedite laboratory turn-around of results to optimize and/or not interfere with the forward progress of the construction schedule. Contractor will notify Engineer a minimum of ten (10) working days in advance of a mobilization to allow adequate time for scheduling inspection.

Prepare a Results Report documenting the sampling and analysis in accordance with procedures, format and schedule identified in the WMP. If sample collection will be phased, report each phase separately, tabulating analytical results with applicable standard(s). Include recommendations for offsite disposal, in accordance with the WMP.

All Results Reports will contain Official analytical data reports from the Contractor selected laboratory(s), which will be forwarded to the Engineer in electronic format according to US EPA's laboratory Electronic Data Deliverable Region V (LEDD Region V) format. Submit the Report in draft and final form to the Engineer according to the schedule in the WMP. No liquid or slurry disposal may proceed until the Results Report is approved by the Engineer.

All sampling will be performed by personnel experienced with environmental water and materials sampling. Retain laboratories certified to perform analyses using EPA-approved methods that possess registration or accreditation by the Pennsylvania Laboratory Accreditation Program (PLAP). Perform personnel protection, decontamination, and contaminant screening consistent with the requirements of the accepted HASP (SectionT.401).

END OF SECTION

T.405 to T.408 OFF SITE DISPOSAL, SOLIDS

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 405 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF CLEAN FILL)
ITEM 406 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED FILL)
ITEM 407 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED RESIDUAL WASTE)
ITEM 408 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED HAZARDOUS WASTE)

T.405.1 GENERAL

T.405.1.1 DESCRIPTION: This work includes the sampling, testing, loading, transport and off-site disposal of solid materials, including Clean Fill, Regulated Fill, Residual Waste and Hazardous Waste from the project right-of-way in accordance with the approved Waste Management Plan (Section T.402).

T.405.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.404 – WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING
E. T.409 to T.410 – OFF-SITE DISPOSAL, LIQUIDS

T.405.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest edition of applicable laws, regulations, guidance, provisions and recommendations, including, but not necessarily limited to those listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 281/2012, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. PADEP Management of Fill, Document 258-2182-773
4. 25 Pa. Code Chapters 287 to 299 (residual waste regulations)
5. 25 Pa. Code Chapters 271 to 285 (municipal waste regulations)
6. Solid Waste Management Act, 35 P.S. §§ 6018.101 et seq.

7. Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 et seq.

T.405.1.4 SUBMITTALS

A. Submittals shall be in accordance with T.405.3 below.

T.405.2 MATERIALS - In accordance with T.405.3 below.

T.405.3 CONSTRUCTION – Once material is classified pursuant to the approved Waste Management Plan, contractor will load and deliver materials to approved receiving facilities via designated routes.

At least 10 days before disposing, submit the disposal procedure and location to the Engineer for approval. Contractor shall identify proposed waste transporter(s) including a commitment letter(s) from properly licensed and insured hauler/transporter(s), approved in the WMP. This information shall include, but not be limited to, the name and USEPA identification number of the hauler/transporter, address, name of responsible contact for the hauler, telephone number for the contact, list of types and sizes of all transport vehicles and equipment to be used, a description of proposed transportation methods and procedures for hauling waste materials, including type of vehicles that will be used for each type of waste, any and all necessary permit authorizations for each type of waste transported, and previous experience in performing the type of work specified herein.

Contractor will assure soils meet Contractor selected disposal facility permit soil quality characterization requirements prior to disposal. Contractor will sample and test soils according to methods identified in accordance with Section T.402 and facility disposal permit requirements, as required, if sampling and testing in accordance with Section T.403 did not meet disposal facility testing requirements.

Prior to transporting any material off-site, Contractor shall provide Engineer with documentation of the disposal facility's acceptance of the regulated material, including a commitment letter from the disposal facility indicating that it has the capacity to accept the volume of waste material and stating that it will be open for business during the Contract duration to accept the volume of waste materials.

The Contractor shall ensure that all operations associated with the handling loading, transportation and disposal of materials are in compliance with applicable Federal and State Department of Transportation regulations. Transport, placard, dispose, document and report all residual and non-hazardous waste according to Pennsylvania Title 25, Chapters 271,273,279, 285 and 299. Transport and dispose of all Hazardous Waste, using an approved licensed transporter according to 40 CFR 263, 49, CFR 171-179 and Pennsylvania Title 23, Chapters 260-270. Comply with all of the manifesting, certification, placarding and reporting requirements for hazardous waste in accordance

with 40 CFR 262, 40 CFR 268, 40 CFR 761, and Pennsylvania Title 25, Chapters 260-270. Comply with any local requirements, including posted weight limitations on roads and bridges.

Verify that all waste types are completely covered during transport. Verify that a truck is properly designated and placarded for the type of waste it is transporting. Verify that the transportation vehicle carries the following information: County and State where waste originated, name and address of the carrier, and name and location of disposal facility.

Once material leaves the Project right-of-way, the Contractor is responsible for ensuring that the handling procedures, placement method, and disposal location are according to applicable Federal, State, and local laws, rules, and requirements, including permits that may be issued for the Project. Provide a certification for each shipment that the waste was accepted by the recycling or disposal facility, and properly treated and disposed. If the disposal of the material results in a violation notice from any governmental authority, immediately correct the violation. Indemnify and defend the Delaware River Port Authority for any violation incurred, penalty assessed, or any claims, suits, losses, demands or damages of whatever kind or nature arising out of, or claimed to arise out of, the improper disposal of excess or unsuitable materials.

END OF SECTION

T.409 to T.410 OFF SITE DISPOSAL, LIQUIDS

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

ITEM 409 OFF SITE DISPOSAL, LIQUIDS, (DISPOSAL OF NON-HAZARDOUS WATER)
ITEM 410 OFF SITE DISPOSAL, LIQUIDS, (DISPOSAL OF HAZARDOUS WATER)

T.409.1 GENERAL

T.409.1.1 DESCRIPTION: This work includes the sampling, laboratory testing, loading, transport and off-site disposal of liquid materials, including drilling slurry, dewatering waste, decontamination waste and/or other liquid waste from the project right-of-way in accordance with the approved Waste Management Plan (Section T.402) and as characterized in accordance with Section T.404.

T.409.1.2 RELATED SECTIONS

A. T.401 – HEALTH AND SAFETY PLAN
B. T.402 – WASTE MANAGEMENT PLAN
C. T.403 – EXCAVATION SAMPLING, ANALYSIS AND REPORTING
D. T.404 – WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING
E. T.405 to T.408 – OFF-SITE DISPOSAL, SOLIDS

T.409.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest edition of applicable laws, regulations, guidance, provisions and recommendations, including, but not necessarily limited to those listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT Publication 408/2016-5, dated 10/05/2018. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
2. PennDOT Publication 281/2012, latest edition. References to the "Department" shall be interpreted to mean "the Authority" or its "Designee".
3. 25 Pa. Code Chapters 287 to 299 (residual waste regulations)
4. 25 Pa. Code Chapters 271 to 285 (municipal waste regulations)
5. Solid Waste Management Act, 35 P.S. §§ 6018.101 et seq.
6. Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 et seq.

T.409.1.4 SUBMITTALS

A. Submittals shall be in accordance with T.409.3 below.

T.409.2 MATERIALS - In accordance with T.409.3 below.

T.409.3 CONSTRUCTION – Once material is classified pursuant to the approved Waste Management Plan, contractor will load and deliver materials to approved receiving facilities via designated routes.

At least 10 days before disposing, submit the disposal procedure and location to the Engineer for approval. Contractor shall identify proposed waste transporter(s) including a commitment letter(s) from properly licensed and insured hauler/transporter(s). This information shall include, but not be limited to, the name and USEPA identification number of the hauler/transporter, address, name of responsible contact for the hauler, telephone number for the contact, list of types and sizes of all transport vehicles and equipment to be used, a description of proposed transportation methods and procedures for hauling waste materials, including type of vehicles that will be used for each type of waste, any and all necessary permit authorizations for each type of waste transported, and previous experience in performing the type of work specified herein.

Contractor will assure all dewatered liquids/slurry meet Contractor selected disposal facility permit characterization requirements prior to disposal. Contractor will sample and test dewatered liquid/slurry according to methods identified in accordance with Section T.402 and disposal permit requirements, as required, if sampling and testing in accordance with Section T.404 does not meet disposal facility testing requirements.

Prior to transporting any material off-site, Contractor shall provide Engineer with documentation of the disposal facility's acceptance of the regulated material, including a commitment letter from the disposal facility indicating that it has the capacity to accept the volume of waste material and stating that it will be open for business during the Contract duration to accept the volume of waste materials.

The Contractor shall ensure that all operations associated with the handling loading, transportation and disposal of materials are in compliance with applicable Federal and State Department of Transportation regulations. Transport, placard, dispose, document and report all residual and non-hazardous waste according to Pennsylvania Title 25, Chapters 271,273,279, 285 and 299. Transport and dispose of all Hazardous Waste, using an approved licensed transporter according to 40 CFR 263, 49, CFR 171-179 and Pennsylvania Title 23, Chapters 260-270. Comply with all of the manifesting, certification, placarding and reporting requirements for hazardous waste in accordance with 40 CFR 262, 40 CFR 268, 40 CFR 761, and Pennsylvania Title 25, Chapters 260-270. Comply with any local requirements, including posted weight limitations on roads and bridges.

Once material leaves the Project right-of-way, the Contractor is responsible for ensuring that the handling procedures, placement method, and disposal location are according to applicable Federal, State, and local laws, rules, and requirements, including permits that may be issued for the Project. If the disposal of the material results in a violation notice from any governmental authority, immediately correct the violation. Indemnify and defend the Delaware River Port Authority for any violation incurred, penalty assessed, or any claims, suits, losses, demands or damages of whatever kind or nature arising out of, or claimed to arise out of, the improper disposal of liquid wastes.

END OF SECTION

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SECTION T.415 TEMPORARY WORK PLATFORM AND PROTECTION SHIELDS – SIGNAL GANTRIES

T.415.1 GENERAL

T.415.1.1 DESCRIPTION

This work shall consist of designing and furnishing of all labor, materials, tools and equipment for the construction, erection, maintenance, removal and disposal of temporary work platforms and shielding necessary for the signal gantry replacement and bracket modifications shown on the contract drawings. This work includes, but is not limited to temporary platforms, temporary framing, temporary handrails, temporary protective devices, as required to perform the work and/or as indicated on the Contract Plans. This platform shall also serve as containment of debris and fall protection. Note that workers shall also be protected with a personal fall arrest protection system.

Contractor is not permitted to store materials on the existing walkway.

T.415.1.2 RELATED SECTIONS

A. Section T.417 Demolition of Existing Signal Gantries

B. Section T.418 Signal Gantries

C. Section T.421 Aluminum Walkway Grating – Signal Gantries

D. Section T.422 Surface Preparation and Coating for Steel – Signal Gantries

T.415.1.3 STANDARDS

A. Except as modified by the Contract Documents, all work under this section shall comply with the latest applicable provisions and recommendations as listed below. In the event of conflicts, the more stringent requirements/provisions shall govern.

1. PennDOT - Publication 408/2016-5, dated 10/05/2018. References to the “Department” shall be interpreted to mean “DRPA or its Designee”.
2. PennDOT Publication 15, latest edition. References to the “Department” shall be interpreted to mean “DRPA or its Designee”.

3. AASHTO Guide Design Specifications for Bridge Temporary Works, 1995 edition with 2008 Revisions.

4. AASHTO LRFD Bridge Design Specifications 7th Edition, including 2015 interim revisions.

5. American Society for Testing and Materials (ASTM) Specifications.

6. AASHTO/AWS D1.5M/D1.5:2010, Bridge Welding Code.

7. Occupational Safety and Health Administration (OSHA).

8. Safety Administrative Manual for the Delaware River Port Authority

T.415.1.4 SUBMITTALS

A. Submittals shall be in accordance with E.24 and E.27 of the General Provisions.

B. Provide erection drawings with design calculations, weights of stored materials, weights and operational data of the proposed construction equipment to be supported on the existing structures, and supporting data in sufficient detail to permit a structural review of the Contractor's proposed design of temporary work. All calculations and drawings prepared by the Contractor shall be stamped by a Professional Engineer licensed to practice in the State of New Jersey and the Commonwealth of Pennsylvania. The erection drawings shall be submitted sufficiently in advance of proposed use to allow for their review, revision if required, and approval, without delay to the Work.

C. Do not start the construction of any temporary work for which erection drawings are required until the drawings have been reviewed and approved by the Engineer. Such review will not relieve the Contractor of responsibility for any adverse effects resulting from the use of the erection drawings, or any other responsibilities under this Contract.

D. All erection drawings shall contain itemized materials list, with conforming material standards, manufacturer's trade names, as applicable, and with current model or code number of their products.

T.415.1.5 QUALITY ASSURANCE

A. Contractor's quality control requirements shall be in accordance with Section SP.25 of the Special Provisions.

B. The design of temporary construction work including allowable stresses, shall conform to an established and accepted design code or specification for such Work. The design shall be reviewed and approved by the Engineer. When manufactured devices are to be employed, the designs shall not result in loads on such devices in excess of the load ratings recommended by their manufacturers.

C. The design calculations and the erection drawings shall be signed and stamped by a Professional Engineer licensed in the State of New Jersey and the Commonwealth of Pennsylvania.

D. Temporary construction work shall be constructed, erected and removed in conformance with the approved erection drawings. The contractor shall verify that the quality of the materials and and the loads are consistent with those assumed in the design. The loads of stored materials shall be dispersed as assumed.

E. Unless otherwise permitted, all temporary construction work shall be maintained and eventually removed from the job site, and shall remain the property of the Contractor upon completion of their use. The areas involved shall be restored to their original or planned conditions, and cleaned of all debris.

T.415.1.6 DELIVERY, STORAGE AND HANDLING

A. All required materials shall be delivered, stored and handled at the Contractor's designated area in accordance with the respective Sections.

B. Materials shall be carefully transported and handled to prevent damage. The materials shall be protected from the environment, damage and theft.

C. Temporary safety and debris nets shall be carefully handled and transported to prevent damage to the materials. Materials to be used shall be stored at the Contractor's designated area so as to prevent damage and theft.

T.415.2 PRODUCTS

T.415.2.1 MATERIALS

A. Stress graded timber and lumber shall conform to the following:

1. ASTM D245
2. ASTM D2915
3. Stress graded timber and lumber used for the construction of temporary protective shields shall be “Fire-Retardant Treated”.

B. Plywood shall conform to the following:

1. ASTM D3501
2. ASTM D3043
3. ASTM D3500
4. Plywood used for the construction of temporary protective shields shall be “Fire-Retardant Treated”.

C. All other materials shall conform to the standards presumed in the design.

T.415.2.2 DESIGN CRITERIA

The work performed under this Section shall be guided by AASHTO’s “Guide Design Specifications for Bridge Temporary Works” and as further specified herein.

A. Dead Loads – Dead loads shall be calculated according to the physical properties of the materials used in the construction.

B. Live loads – The live loads shall consist of working laborers, inspection staff, equipment and stored construction material. The minimum live load shall be 75 PSF and a concentrated load of 1,000 lbs so placed as to produce maximum stress within various components of the temporary work platforms. The contractor’s calculation shall also include checking of the existing structure for the temporary dead and live loads.

C. Wind loads – The structure shall account for wind loads as specified by ASCE 7-16, Minimum Design Loads for Buildings and Other Structures,

for temporary conditions. The contractor is made aware that the tarps that are used as containment shall be either removed or battened down during such extreme events. The design shall be cognizant of such possibilities and shall be detailed such that the work of removal is facilitated.

D. Attachments to the existing structure are permitted provided no new holes are introduced for temporary bolting. If existing holes are used the holes shall be restored by placing bolts after the temporary structure has been removed.

E. Temporary protective shields shall be solid, and shall be constructed such as to prevent any dust, debris, concrete, steel, other materials or tools from falling through the shields. The shields shall be capable of resisting wind forces which may uplift the shields which may be carrying debris. Temporary protective shields shall be constructed of such materials and in such a manner so as not to become a fire hazard when devices emitting flames are in use

F. Temporary work platforms shall comply with the applicable requirements of OSHA regulations 29 CFR Part 1926.450.

T.415.3 EXECUTION

T.415.3.1 ERECTION

A. For work over the waterway, Contractor should provide a safety boat in accordance with the requirements of the DELAWARE RIVER PORT AUTHORITY'S SAFETY ADMINISTRATIVE MANUAL (SAM), Working over Water.

B. Temporary structural steel support members shall be erected in conformance with the PennDOT Publication 408/2016, and in accordance with Contractor's erection procedure as reviewed and approved by the Engineer.

C. Erection and/or construction requiring timber, lumber, and plywood for Temporary Construction, shall be in accordance with Contractor's erection and/or construction procedure requiring timber, lumber, and plywood, as approved by the Engineer.

D. Construction, installation and maintenance of temporary work platforms and shielding shall be as follows:

1. Construction, erection, maintenance and removal of Temporary Construction Work shall be performed in accordance with shop/erection drawings which were reviewed and approved by the Engineer. The drawings shall be prepared, signed, and sealed by a Professional Engineer licensed in the State of New Jersey and the Commonwealth of Pennsylvania. The drawings, designs and details shall be in accordance with all applicable laws, rules, codes and regulations.

2. The maintenance of the temporary work platforms and shielding shall include replacement in case of partial or complete failure, at no additional cost to the Authority. In the event of the Contractor's delay or inadequate progress in making repairs and replacement, the Authority may perform such repairs and replacement necessary to restore the temporary work platform and shielding, either by its own forces or by other contractors, and deduct the Authority's costs therefor from any payments due or to become due to the Contractor under this Contract or any other agreement between the Contractor and the Authority. If such costs exceed the amount due the Contractor, the Contractor shall immediately pay such excess to the Authority upon demand.

3. If the Engineer, in his sole discretion, determines that the protective devices (solid shields, safety nets, and the like) are improperly installed and/or are not providing the required level of protection, or that the protective devices have not been properly maintained, all Work at the affected locations shall cease, until corrective measures acceptable to the Engineer are completed.

E. Removal and disposal of temporary construction work other than structural steel support beams.

1. Temporary Construction Work, when no longer required for their intended task(s), as determined by the Engineer, shall be carefully removed and disposed of in accordance with all applicable laws, codes, rules and regulations.

F. Removal and disposal of temporary structural steel support beams

1. Temporary structural steel support beams, including connections and fasteners, when no longer required, as determined by the Engineer, in coordination with Contractor's approved schedule of operations, shall be removed and disposed of in accordance with all applicable laws, codes, rules, and regulations.

2. Reuse of temporary structural steel support beams and connection angles shall require prior written authorization of the Engineer. High strength bolts, nuts and washers shall not be permitted to be reused after bolts are fully tensioned.

G. Field quality control

1. Temporary Construction Work shall be inspected at various intervals during the Work in order to maintain continuous structural integrity, maintain proper maintain proper lines and elevations safety levels.

2. During the course of the Work, it may be necessary to disconnect, support, or adjust steel, which is to remain in the structure. For these situations, submit the procedures for disconnecting, supporting, or adjusting the steel, as necessary, to the Engineer for prior approval. The Contractor's proposals shall be approved prior to the actual commencement of any disconnecting, supporting or adjusting of steel.

3. In the event any new or existing materials are damaged during the Work, repair or replace the damage, as directed by the Engineer, in a manner satisfactory to the Engineer, at no additional cost to the Authority.

H. Erection and removal of temporary protective shielding

1. In addition to complying with all Federal, State and Local laws, codes, rules and regulations and the requirements in the Contract Documents pertaining to the safety and health of individuals and the protection of property, the Contractor shall provide and maintain solid, fire retardant, dust-tight protective shields over all "No Drop" zone areas as approved by the Engineer.

2. The protective shields shall be erected prior to the start of any Work over a "NO DROP" zone area. Protective shields shall be located so as not to become a fire hazard when torches are in use. The Engineer will be the sole judge as to whether or not sufficient protection has been provided to perform the Work.

3. Protective shield shall remain in place until Work over the area has been completed, and shall be removed only when directed by the Engineer. Prior to removal, each protective shield shall be cleaned to the satisfaction of the Engineer.

4. Obtain the approval of the Engineer before commencing any Work above the protective shields.

5. If during the Work, the Engineer, in his sole discretion, deems that the protective shields are not providing the required level of protection, or that the Contractor has failed to properly maintain the protective shields, all Work at the affected location shall cease until corrective measures acceptable to the Engineer are instituted and completed.

6. Repair damage to or replace damaged portions of the structures resulting from the use of Protective Shields. All repair and replacement methods shall be reviewed and approved by the Engineer. Welding to existing steel or drilling of holes in existing steel shall not be permitted.

E. For work areas over the waterway, work to install or demolish platforms and shielding shall cease upon the approach of a vessel desiring to pass under the bridge.

END OF SECTION

SECTION T.416 RELOCATING AND RESETTING EXISTING STRUCTURE MOUNTED SIGNS – SIGNAL GANTRIES

T.416.1 GENERAL

T.416.1.1 DESCRIPTION

This work is removal, transportation off the bridge, stockpiling, storing, transporting back onto bridge of the existing gantry signs from the existing signal gantries to an off-site staging area and then back to the new signal gantries as shown on the Signal Gantry Plans. This work also includes the removal of the existing gantry signs from the existing signal gantries and the resetting onto existing mounting brackets on a different signal gantry. The signs will be mounted on new structural steel mounting brackets.

The mounting brackets shall be as specified in Section T.419 – Sign and Signal Mounting Brackets – Signal Gantries.

Coordinate all demolition and reinstallation activities with the DRPA's representative.

T.416.2 MATERIALS

In accordance with Section T.419

T.416.3 METHOD OF CONSTRUCTION

A. Remove sign and support framing from existing gantry structures.

B. Disassemble signs from mounting brackets. Remove or modify existing brackets to accommodate revised sign location.

C. Mount sign panel onto new or modified brackets connected to new gantry, or existing gantry for the temporary condition. Clean or repair sign panel as needed.

D. Ensure that all signs are installed in compliance with the Drawings, in terms of horizontal alignment and vertical clearance. Sign locations shall not be revised without approval of the Engineer.

T.416.4 ORDER OF RELOCATION

(1) Relocate or reset structure mounted signs to the locations noted below for the duration of all construction activities at the gantries described below. Sign names and locations are noted on the plans.

a. Variable speed limit signs shall all be relocated to a temporary storage facility during construction at each gantry.

b. Relocate Signs E3 and E4 to temporary storage facility for duration of project.

c. Relocate Sign E1 to temporary storage facility during construction at Gantries A and C.

d. Reset Sign E5 to Gantry B during construction at Gantries A and C.

e. Reset Sign E2 to Gantry C during construction at Gantries B and I.

f. Relocate Signs E7 and E8 to temporary storage facility during construction at Gantries B and I

g. Reset Sign E6 to Gantry C during construction at Gantries D and J.

h. Relocate Signs E9 and E10 to temporary storage facility during construction at Gantries D and J

(2) Relocate or reset structure mounted signs into the original position on the new mounting brackets on the new signal gantry at the completion of all construction activities as noted above.

END OF SECTION

SECTION T.417 DEMOLITION OF EXISTING SIGNAL GANTRIES – SIGNAL GANTRIES

T.417.1 GENERAL

T.417.1.1 DESCRIPTION: The work of this section consists of removal and disposal of existing signal gantries “A”, “B”, “C”, “D”, “I” and “J”. This work also includes the removal and disposal of components of the gantry support brackets, walkway support and grating required to accommodate the new signal gantries as detailed on the plans.

Removal and reinstallation of existing electrical equipment, including conduit, wiring, security cameras, electrical boxes and junction boxes will be paid for under separate items. Coordinate demolition work with the DRPA’s representative.

T.417.1.2 PERFORMANCE AND CONDITIONS

A. The work of this Section will be done in accordance with Contractors preferred Ways and Means, within the limits and guidelines herein prescribed.

B. Demolition will be permitted to occur at two gantries simultaneously, as detailed in SP.1, Description of Work.

C. The contractor shall allow for adequate lead time between the completion of work at one pair of gantries and the start of work at the next pair of gantries to ensure that the signage is operational to the satisfaction of the DRPA as detailed in SP.1, Description of Work.

T.417.1.3 SUBMITTALS

A. Submittals shall be in accordance with E.23, E.24, and E.27 of the General Provisions.

B. The contractor shall submit a written work plan describing equipment, trucks, positioning of lifting equipment and of trucks during the demolition operation. Demolition work may not start until the contractor has submitted a schedule and procedure for the demolition and coordinated the work with maintaining electric and fiber to the other gantries which are to remain.

C. The contractor shall submit means and methods, including plans and supporting calculations, for temporarily supporting the existing walkway fascia beam while modifications are being made to the gantry support brackets. The plans and calculations shall be stamped

by a Professional Engineer registered in the Commonwealth of Pennsylvania and the State of New Jersey.

D. Submit MPT plan in accordance with Technical Specification T.423.

T.417.2 METHOD OF CONSTRUCTION

T.417.2.1 REMOVAL AND DISPOSITION

A. Removal from the in situ position shall be carried out with care. Lifting equipment used in placing removed material in trucks shall be of adequate capacity. After the removal from the site, all material is property of the Contractor. Disposal of the materials shall be in accordance with local and federal statutes.

T.417.2.2 TEMPORARY CONSTRUCTION WORK

A. Materials shall be in accordance with Section T.415.2.1 of these provisions

B. Design of any temporary construction work, shall be in accordance with T.415.2.2 of these provisions.

T.417.2.3 HAZARDOUS WASTE

A. All contained debris, be it from the work platform or in the trucks shall be tested for hazardous waste and shall be disposed of according to law.

END OF SECTION

SECTION T.418 SIGNAL GANTRIES – SIGNAL GANTRIES

T.418.1 GENERAL

T.418.1.1 DESCRIPTION: This work shall consist of furnishing and placing structural steel as shown and detailed in the Contract Documents for new signal gantries and gantry support brackets. This includes, but is not limited to, hollow structural shapes, wide flange beams, angles, plates and connections.

A. Included with this item are steel ladders, angles for railings, channel and beam supports for gantry walkway and bridge walkway, wide flange beams, bracket splice plates, connection plates and angles.

B. All structural steel is to be painted. The price for this is to be made part of the cost of this item.

C. Not included in this item are sign and signal mounting brackets as specified in T.419.

T.418.1.2 RELATED SECTIONS

A. Section T.422 – Surface Preparation and Coating for Steel – Signal Gantries

T.418.1.3 STANDARDS

A. PennDOT - Publication 408/2016-5, dated 10/05/2018

1. References to the "Department" shall be interpreted to mean "DRPA or its Designee".

B. AASHTO LRFD Bridge Construction Specifications 3rd Edition, including latest interim revisions.

C. AASHTO LRFD Bridge Design Specifications 7th Edition, including latest interim revisions.

D. AWS D1.5M/D1.5:2015, Bridge Welding Code

T.418.1.4 SUBMITTALS

A. Prior to commencing the fabrication work, the Contractor shall submit the following Quality Assurance Program items:

1. A work plan and schedule that cover the entire scope of construction.

2. A written narrative describing the Contractor's Quality Assurance Program and the qualifications of individuals responsible for supervising the program. See Section T.418.1.6 for additional requirements.

B. Field Measurements as Required

1. The Contractor shall establish all field measurements required for proper fabrication and installation of structural steel members.

2. The Contractor shall submit for approval to the Engineer, Working drawings showing all points of field measurements and proposed method of measurements. The results of these measurements shall be submitted for review by the Engineer.

C. Erection Drawings and Shop Drawings

1. The Erection Drawings and Shop Drawings shall be prepared and submitted in accordance with E.24 and E.27 of the General Provisions.

2. The Contractor shall submit Erection Drawings for approval to the Engineer. Erection Drawings shall contain all information required for the erection of structural steel, including, at a minimum, the following:

   a. Details and limits of each section to be erected
   b. Method of aligning adjacent sections during erection
   c. Method for connection and removal of supports and lifting attachments

3. Submit Shop Drawings showing all shop and erection details including welding techniques and sequence.

4. Shop Drawings shall be provided with a bill of materials and weight of each part.

5. The Erection Drawings shall show the locations of components in reference to a staged construction scheme.

D. Mill Reports

1. Prior to commencing the fabrication of steel, submit three certified copies of all mill reports covering the chemical and physical properties of all steel used in this Contract. Such

certificates shall be obtained from the mills producing the steel and shall certify that the steel meets the minimum requirements as to physical properties, inspection, marking and tests for structural steel as defined by the American Society for Testing and Materials (ASTM) for the type of steel shown on the Contract Drawings.

2. Each shipment of high strength bolts shall be accompanied by a mill certification report that shows mill test results for the included production lots.

E. Welder's Certification and Qualification Test Procedures

F. Fabricator's Certification of the AISC Quality Assurance Program, Category III, Major Bridges

G. Erector's Certification of the AISC Quality Assurance Program, Advanced Certified Steel Erector

H. Welding Procedure Specifications, including descriptive data, such as type and electrical power requirements, of the welding equipment.

I. Design of Temporary Lifting Supports and Apparatus

The calculation and the erection drawings containing the details of the lifting apparatus shall be prepared and sealed by a Professional Engineer licensed in the state of New Jersey and Pennsylvania prior to be submitted to the Engineer for approval.

T.418.1.5 DELIVERY, STORAGE AND HANDLING

A. Structural material shall be stored above the surface of the ground on platforms, skids, or other supports, and shall be protected from surface deterioration and kept free from accumulations of dirt, oil, or other foreign matter. No material shall, at any time, be dropped, thrown, or dragged on the ground. Stringers shall be handled and stored with their webs vertical and shall be adequately shored, braced, and/or clamped to resist any lateral forces which might occur. Long members shall be supported at a sufficient number of intermediate locations to ensure that there is no damage from deflection. Permanent distortion resulting from improper handling or storage will be cause for rejection. Any damage incurred during storage at the shop for any reason shall be corrected by the Fabricator prior to acceptance for shipment by the Inspector. All fabricated

material stored by the Contractor at the jobsite or other approved location will be subject to inspection by the Engineer and any corrective action required as the result of damage during storage shall be performed by the Contractor.

B. Repairs to damaged structural steel shall be done in accordance with procedures approved by the Engineer.

T.418.1.6 QUALITY ASSURANCE

A. Contractor's quality control requirements shall be in accordance with Section SP.25 of the Special Provisions.

B. Fabrication and Erection QA Inspection

All testing is to be performed by a 3rd party independent testing agency retained by the Contractor and approved by the Engineer. The Engineer will witness all testing and may direct additional testing as he deems necessary; however, these costs will be borne by the Contractor. QA Inspectors will witness, inspect and certify that all structural steel, including fasteners, furnished under this section have been fabricated in accordance with the requirements of the Contract Documents. The QA Inspectors have the authority to reject materials and workmanship, which do not conform to the requirements of the Contract Documents. Materials and workmanship which are inspected "in process" (while being fabricated) and which are found to contain defects or to have been subjected to damaging fabrication procedures shall be rejected while still in process. The inspectors have the right to perform nondestructive and destructive tests of materials and workmanship, including non-destructive weld testing. The Contractor shall:

1. Assure that QA Inspectors have free access at all times to the material to be inspected.
2. Notify QA Inspectors whenever work is to be done, in sufficient time to arrange for inspection.
3. Discontinue any practice which, in the opinion of the QA Inspectors, is not in accordance with the specifications or would be detrimental to the work of this section.
4. Be responsible for the acceptability of his products. His Quality Control (QC) Inspectors shall make all necessary inspections and tests prior to, during, and after fabrication to ensure that materials and workmanship meet the requirements of the Contract Documents.

C. The Contractor shall qualify all welding processes and welding operators in accordance with the requirements AWS D1.5M/D1.5.

D. The Contractor shall maintain a quality assurance program for both fabrication and erection of structural steel to assure that all installations conform to the requirements of Contract Documents.

E. Fabrication shall be certified under the AISC Quality Certification Program Category Major Steel Bridges.

F. Control of Quality: Materials will be inspected after delivery. The Engineer may reject those that do not meet the requirements of the Contract Documents. Materials, methods, and practices relating to manufacture, fabrication, erection procedures, and workmanship details that apply to the Work of this Section are subject to inspection in the shop and field. Materials furnished without meeting specified requirements, whether in place or not, are subject to subsequent rejection if found nonconforming and shall be removed and replaced with conforming material at no additional cost.

G. High Strength Bolts

1. Each shipment shall be accompanied by a mill certification report that shows mill test results for the included production lots. The Engineer reserves the right to sample and test bolts from any shipment.

2. Bolts will be sampled by the Engineer before use and tested in accordance with ASTM specifications. If any samples do not meet the test requirements, then the corresponding lot of bolts shall be rejected for use.

T.418.2 MATERIALS

A. Structural Steel:
(1) General:
a. Conform to AASHTO M 160/M 160M (ASTM A6/ A6M)
b. Hollow Structural Shapes shall conform to ASTM A500, Grade B
c. Rolled sections and structural plate shall conform to ASTM A709 Grade 50.

B. Fasteners:
   (1) Fasteners shall conform to the requirements of ASTM A325, ASTM 563 and ASTM F436.

C. Consumables:
   (1) Welding consumables shall conform to AWS A5.01: 2013

D. Paint:
   (1) For paint work, refer to the item on painting on Section T.422.

T.418.3 SHOP DRAWINGS

A. Before fabrication, the Contractor shall prepare Shop Drawings.

B. Shop Drawings shall show all fabrication details including all shop and field connections. Detailing work of structural steel may only proceed after the Contractor has reviewed design and drawings of the existing structure and has conducted the necessary field verifications as described in the notes of the drawings.

T.418.4 FABRICATION

A. Fabrication Shop:
   (1) The fabrication shop shall be a quality shop certified by the AISC for the fabrication of Major Steel Bridges (SBR).

B. Workmanship Codes:
   (1) Except as otherwise specified, structural steel shall be fabricated and erected in accordance with the AASHTO LRFD Bridge construction specifications.
   (2) Welding shall be executed in accordance with AWS D1.5

C. Hole Making:
   (1) Shop fabricated holes for fasteners prepared in the shop, in general, shall be either drilled, plasma cut, or cored. All burrs shall be removed.

D. Truss Camber:
   (1) The truss shall be fabricated without negative camber.

E. Painting:
   (1) Prepare and provide a 3 coat paint system in accordance with Section T.422.

T.418.5 TRANSPORT, STORAGE AND HANDLING

A. All structural steel shall be handled in a manner that preserves the structural integrity of the material and does not introduce geometry changes.

B. Place materials stored above ground on platforms, skids or other supports. Place and support material to avoid overstress, deformation or damage. Keep materials free from dirt, grease and other foreign materials. Ensure proper drainage and protect materials from corrosion.

T.418.6 ERECTION

A. Prior to erection, the Contractor is to submit erection plans and procedures and meet maintenance and protection of traffic requirements as defined in Section T.423.

B. Field holes - New and existing holes for fasteners, found or made in the field, shall be treated as follows:
   (1) New holes in the field on existing or new steel shall be drilled.
   (2) Existing holes that are reused shall be cleaned before new fasteners are used.

C. Bolt tightening – Tightening of fasteners conforming to ASTM 325 shall be tightened to a minimum tension as required by the AISC "Specification for Structural Joints Using ASTM A325 or A490", for Slip Critical Connections. Tightening shall be done by the "turn of the nut" method as required by the actual grip and described in the AISC Specifications.

D. Repair any damage to the new or existing steel component coating system in accordance with Section T.422.

END OF SECTION

SECTION T.419 SIGN AND SIGNAL MOUNTING BRACKETS – SIGNAL GANTRIES

T.419.1 GENERAL

T.419.1.1 DESCRIPTION: This work shall consist of furnishing and installing structural steel as shown and detailed on the Contract Plans for mounting signs to new signal gantries.

All structural steel is to be painted with a three coat paint system. Painting shall be performed in accordance with Section T.422. The price for this is to be made part of the cost of this item.

T.419.1.2 STANDARDS

A. PennDOT - Publication 408/2016-5, dated 10/05/2018

1. References to the "Department" shall be interpreted to mean "DRPA or its Designee".

B. AASHTO LRFD Bridge Construction Specifications 3rd Edition, including latest interim revisions.

C. AASHTO LRFD Bridge Design Specifications 7th Edition, including latest interim revisions.

D. AWS D1.5M/D1.5:2015, Bridge Welding Code

T.419.1.3 SUBMITTALS

A. Prior to commencing the fabrication work, the Contractor shall submit the following Quality Assurance Program items:

1. A work plan and schedule that cover the entire scope of construction.

2. A written narrative describing the Contractor's Quality Assurance Program and the qualifications of individuals responsible for supervising the program. See Section T.418.1.6 for additional requirements.

B. Field Measurements as Required

1. The Contractor shall establish all field measurements required for proper fabrication and installation of structural steel members.

2. The Contractor shall submit for approval to the Engineer Working drawings showing all points of field measurements and proposed

method of measurements. The results of these measurements shall be submitted for review by the Engineer.

C. Erection Drawings and Shop Drawings

1. The Erection Drawings and Shop Drawings shall be prepared and submitted in accordance with Sections E.24 and E.27 of the General Provisions.

2. The Contractor shall submit Erection Drawings for approval to the Engineer. Erection Drawings shall contain all information required for the erection of structural steel, including, at a minimum, the following:

   a. Details and limits of each section to be erected; and
   b. Method for connection and removal of supports and lifting attachments.

3. Submit Shop Drawings showing all shop and erection details including welding techniques and sequence.

4. Shop Drawings shall be provided with a bill of materials and weight of each part.

5. The Erection Drawings shall show the locations of components in reference to a staged construction scheme.

D. Mill Reports

1. Prior to commencing the fabrication of steel, submit three certified copies of all mill reports covering the chemical and physical properties of all steel used in this Contract. Such certificates shall be obtained from the mills producing the steel and shall certify that the steel meets the minimum requirements as to physical properties, inspection, marking and tests for structural steel as defined by the American Society for Testing and Materials (ASTM) for the type of steel shown on the Contract Drawings.

2. Each shipment of high strength bolts shall be accompanied by a mill certification report that shows mill test results for the included production lots.

E. Welder's Certification and Qualification Test Procedures

F. Fabricator's Certification of the AISC Quality Assurance Program, Category III, Major Bridges

G. Erector’s Certification of the AISC Quality Assurance Program, Advanced Certified Steel Erector

H. Welding Procedure Specifications, including descriptive data, such as type and electrical power requirements, of the welding equipment.

I. Design of Temporary Lifting Supports and Apparatus

The calculation and the erection drawings containing the details of the lifting apparatus shall be prepared and sealed by a Professional Engineer licensed in the State of New Jersey and the Commonwealth of Pennsylvania prior to be submitted to the Engineer for approval.

T.419.1.4 DELIVERY, STORAGE AND HANDLING

A. Structural material shall be stored above the surface of the ground on platforms, skids, or other supports, and shall be protected from surface deterioration and kept free from accumulations of dirt, oil, or other foreign matter. No material shall, at any time, be dropped, thrown, or dragged on the ground. Long members shall be supported at a sufficient number of intermediate locations to ensure that there is no damage from deflection. Permanent distortion resulting from improper handling or storage will be cause for rejection. Any damage incurred during storage at the shop for any reason shall be corrected by the Fabricator prior to acceptance for shipment by the Inspector. All fabricated material stored by the Contractor at the jobsite or other approved location will be subject to inspection by the Engineer and any corrective action required as the result of damage during storage shall be performed by the Contractor.

B. Repairs to damaged structural steel shall be done in accordance with procedures approved by the Engineer.

T.419.1.5 QUALITY ASSURANCE

A. Contractor’s quality control requirements shall be in accordance with Section SP.25 of the Special Provisions.

B. Fabrication and Erection QA Inspection

All testing is to be performed by a 3rd party independent testing agency retained by the Contractor and approved by the Engineer. The Engineer

will witness all testing and may direct additional testing as he deems necessary; however, these costs will be borne by the Contractor. QA Inspectors will witness, inspect and certify that all structural steel, including fasteners, furnished under this section have been fabricated in accordance with the requirements of the Contract Documents. The QA Inspectors have the authority to reject materials and workmanship, which do not conform to the requirements of the Contract Documents. Materials and workmanship which are inspected "in process" (while being fabricated) and which are found to contain defects or to have been subjected to damaging fabrication procedures shall be rejected while still in process. The inspectors have the right to perform nondestructive and destructive tests of materials and workmanship, including non-destructive weld testing. The Contractor shall:

1. Assure that QA Inspectors have free access at all times to the material to be inspected.
2. Notify QA Inspectors whenever work is to be done, in sufficient time to arrange for inspection.
3. Discontinue any practice which, in the opinion of the QA Inspectors, is not in accordance with the specifications or would be detrimental to the work of this section.
4. Be responsible for the acceptability of his products. His Quality Control (QC) Inspectors shall make all necessary inspections and tests prior to, during, and after fabrication to ensure that materials and workmanship meet the requirements of the Contract Documents.

C. The Contractor shall qualify all welding processes and welding operators in accordance with the requirements AWS D1.5M/D1.5.

D. The Contractor shall maintain a quality assurance program for both fabrication and erection of structural steel to assure that all installations conform to the requirements of Contract Documents.

E. Fabrication shall be certified under the AISC Quality Certification Program Category Major Steel Bridges.

F. Control of Quality: Materials will be inspected after delivery. The Engineer may reject those that do not meet the requirements of the Contract Documents. Materials, methods, and practices relating to manufacture, fabrication, erection procedures, and workmanship details that apply to the Work of this Section are subject to inspection in the shop and field. Materials furnished without meeting specified requirements, whether in place or not, are subject to subsequent rejection

if found nonconforming and shall be removed and replaced with conforming material at no additional cost.

G. High Strength Bolts

1. Each shipment shall be accompanied by a mill certification report that shows mill test results for the included production lots. The Engineer reserves the right to sample and test bolts from any shipment.

2. Bolts will be sampled by the Engineer before use and tested in accordance with ASTM specifications. If any samples do not meet the test requirements, then the corresponding lot of bolts shall be rejected for use.

T.419.2 MATERIALS

A. Structural Steel:
   (1) General. Conform to AASHTO M 160/M 160M (ASTM A6/ A6M).
   (2) Rolled sections, and structural plate shall conform to ASTM A709 Grade 50.

B. Fasteners
   (1) Fasteners shall conform to the requirements of ASTM A325, ASTM 563, and ASTM F436.

C. Consumables
   (1) Welding consumables shall conform to AWS A5.01: 2013

D. Paint: For paint work, refer to the item on painting on Section T.422.

T.419.3 SHOP DRAWINGS

A. Before fabrication, the contractor shall prepare Shop Drawings.

B. Shop Drawings shall show all fabrication details including all shop and field connections.

T.419.4 FABRICATION

A. Fabrication Shop
   (1) The fabrication shop shall be a quality shop certified by the AISC for the fabrication of Major Steel Bridges (SBR).

B. Workmanship Codes

(1) Except as otherwise specified, structural steel shall be fabricated and erected in accordance with the AASHTO LRFD Bridge construction specifications.
(2) Welding shall be executed in accordance with AWS D1.5

C. Hole Making
(1) Shop fabricated holes for fasteners prepared in the shop, in general, shall be either: a) drilled, b) plasma cut, or c) cored. All burrs shall be removed.

D. Painting
(1) Prepare and provide a 3 coat paint system in accordance with T.422.

T.419.5 TRANSPORT, STORAGE AND HANDLING

A. All structural steel shall be handled in a manner that preserves the structural integrity of the material, and does not introduce geometry changes.

B. Place materials stored above ground on platforms, skids or other supports. Place and support material to avoid overstress, deformation or damage. Keep materials free from dirt, grease and other foreign materials. Ensure proper drainage and protect materials from corrosion.

T.419.6 ERECTION

A. Prior to erection, submit an erection plan and procedure incorporating maintenance and protection of traffic requirements as defined in Section T.423.

B. Bolt tightening – Tightening of fasteners conforming to ASTM 325 shall be tightened to a minimum tension as required by the AISC "Specification for Structural Joints Using ASTM A325 or A490", for Slip Critical Connections. Tightening shall be done by the "turn of the nut" method as required by the actual grip and described in the AISC Specifications.

END OF SECTION

SECTION T.420 NOT USED

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SECTION T.421 ALUMINUM WALKWAY GRATING – SIGNAL GANTRIES

T.421.1 GENERAL

T.421.1.1 DESCRIPTION: Perform field measurements, furnish and install aluminum grating, and modify existing grating which serves as the safety walk for the approach spans and gantries to the limits indicated on the contract drawings. The banding, perimeter closure, and/or other edge treatment shown in the plans are also included in this item. Any special panels with clips angles, and hinges are also included. Neoprene isolation pads to prevent the contact of dissimilar metals are also included. For related structural steel support requirements refer to Section T.418 – Signal Gantries

T.421.1.2 QUALITY ASSURANCE

Unless otherwise specified, all designs and materials shall be in accordance with the Standard Specifications for Metal Bar Gratings and Treads as published in the NAAMM (National Association of Architectural Metal Manufacturers) Metal Bar Grating Manual, Sixth Edition, and the NAAMM Metal Bar Grating Engineering Design Manual, MBG 534-14.

T.421.1.3 SUBMITTALS

A. Submit shop drawings (including plans, elevations and details of sections and connections) and descriptive information for the grating specified herein. Indicate details of gratings, plates, component supports, fasteners, openings, perimeter construction details, and tolerances. Include proposed length of grating panels. Shop drawings are to show modifications to existing grating, including cut-outs at proposed gantry locations.

B. Product Data: Submit manufacturer's descriptive product data and current specifications covering products and installation instructions for the following items:

- Grating
- Fasteners
- Banding
- Nosing
- Toe Plates
- Neoprene Isolation Pads

C. Provide load, span and deflection tables

D. Certification: Submit certification that the grating conforms to the specified requirements.

E. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

F. Samples: Submit two samples, 12x18 inch in size illustrating surface finish, color, and texture.

T.421.2 MATERIALS

T.421.2.1 ALUMINUM GRATINGS:

A. Bearing bars shall be either alloy 6061-T6 or alloy 6063-T6, conforming to ASTM B 221 9B 221M).

B. Cross bars and bent connecting bars shall be of alloy 6061 or 6063 conforming to ASTM B 221 9B 221M) or alloy 3003 conforming to ASTM B 210 (B 210M).

T.421.2.2 PERFORMANCE REQUIREMENTS

A. Design Live Load: Uniform load of 85 lb/sq ft; concentrated load of 300 lb force.

B. Maximum Allowable Deflection under Uniform Live Load of 0.25" or L/240 of span, whichever value is smaller.

C. Maximum Spacing between Main Bearing Bars: 1-3/16". Minimum bearing bar thickness = 3/16"

D. Maximum spacing between cross bars: 4".

E. Grating depth = 1 1/2" for gantries and 1” for bridge walkway. Adjust all framing and grating details as required if proposed grating depth is other than 1 1/2" for gantries or 1” for bridge walkway at no additional cost. Submit details for approval.

F. Top surface of Bearing Bars: Serrated or Slip Resistant

G. Finish: Gratings shall be A-41 Clear Anodized.

T.421.2.3 ACCESSORIES

A. Saddle Clips: Aluminum

B. Anchors: Galvanized Steel

C. Perimeter Closure: Of same material as grating. Provide as indicated on the contract drawings.

D. Edge Banding: At discontinuous edges where indicated on the contract drawings.

E. Dissimilar Metal Isolation Pads: Neoprene

T.421.2.4 FABRICATION

All tolerances shall be within the limits of the Metal Bar Grating Manual.

Bandings, nosing, carriers and toe plates, when specified, shall be attached by welding as shown in the Metal Bar Grating Manual.

All cutouts where more than one bearing bar is cut and bearing bars are not supported shall be load banded.

Arrange cutouts to permit grating removal without disturbing items penetrating gratings. Band ends and cuts in grating with bars of same size and material as bearing bars.

Unless specifically ordered otherwise, no welds anywhere on the grating will be ground.

T.421.3 METHOD OF CONSTRUCTION

T.421.3.1 GENERAL

Verify existing conditions before starting work. Verify that opening sizes and dimensional tolerances are acceptable. Verify that supports are correctly positioned and level.

Install components in accordance with manufacturer's instructions. Place frames in correct position, plumb, and level. Anchor bolting through approved plate attachments. Set perimeter closure flush with top of grating and surrounding construction. Secure to prevent movement.

END OF SECTION

SECTION T.422 SURFACE PREPARATION AND COATING FOR STEEL – SIGNAL GANTRIES (INCIDENTAL)

T.422.1 GENERAL

T.422.1.1 DESCRIPTION:

A. SURFACE PREPARATION AND COATING FOR NEW STEEL

1. The scope of work consists of furnishing all labor, materials, equipment, services, and incidentals necessary to perform the shop cleaning, surface preparation, and painting as specified in this Section. The work shall consist of:

   Solvent cleaning and abrasive blast cleaning all new structural steel members; and shop application of a three-coat paint system consisting of an epoxy zinc primer, epoxy intermediate and urethane finish coat.

2. New structural steel elements to receive a three-coat paint system include, but are not limited to the following: all new signal gantries, connection angles, base plates, new support bracket components, transfer beam, framing, and splice plates underneath the walkway grating.

3. When shop painting structural steel, use only PennDOT Bulletin 15 approved paint shops that are certified by the AISC under its Sophisticated Paint Endorsement (SPE) quality program or by the Society for Protective Coatings (SSPC) under its QP3 quality program. Use Shops certified to the “enclosed shop” category. Use shops that are fully certified for the duration of time they are performing surface preparation and coating application. Apply complete coating system in an “enclosed shop” except for touch up painting. For shop removal and disposal of hazardous coating, including but not limited to lead based paint, use only shops certified to SSPC-QP3 and listed in Bulletin 15 as approved paint shops.

B. SURFACE PREPARATION AND COATING FOR EXISTING STEEL

1. The scope of work also includes furnishing all labor, materials, equipment, services and incidentals necessary to perform the spot/zone maintenance painting of existing structural steel that will be reinstalled or connected to the new steel components. This work shall consist of:

   Power tool cleaning existing structural steel members; and field application of a new paint system as detailed in this specification.

2. Existing structural steel elements to receive spot/zone maintenance painting

include, but are not limited to the following: existing walkway and gantry support brackets, fascia member, fascia stringer, fascia bracing, connection plates, angles and WT sections. This also includes the painting of any existing structural steel components for which the surface coating was damaged during the course of the work.

3. For faying surfaces, the new coating system consists of an organic zinc rich primer only (stripe coat and full coat); and for the exposed surfaces, the new coating system consists of an organic zinc rich primer (stripe coat and full coat) and an epoxy intermediate coat.

4. Prior to surface preparation, all chlorides, dirt and bird litter accumulated on the steel surfaces shall be removed via pressure water cleaning. This is not a paint removal method. All hazardous waste generated during paint removal operations, including debris from water cleaning, shall be collected, transported, and legally disposed of in compliance with all Federal, state, and local environmental or other applicable regulations.

T.422.2 JOB CONDITIONS

A. STAGING

1. Any work from the roadway must be done during the allowed short term lane closures as detailed in specification T.423 for Maintenance and Protection of Traffic. If requested by the Contractor and approved by the Engineer, the Contractor may be allowed to use the sections of the north and south maintenance sidewalk that will not be removed for the staging of its materials during the Work. Along with the written request to the Engineer, the Contractor shall provide detailed drawings and calculations prepared by a Professional Engineer licensed in the State of New Jersey and Commonwealth of Pennsylvania demonstrating that the stresses induced by the placement of any material on the maintenance sidewalks, in are in accordance with the American Association of State Highway and Transportation Officials (AASHTO) guidelines. Written approval of the drawings and calculations from the Engineer is required prior to the Contractor’s use of the maintenance sidewalks for staging purposes.

B. OTHER CONDITIONS

1. Use protective coverings, shields, or masking, as necessary, to protect electronic equipment, power and communication lines, high voltage lines and surfaces that are not designated to be cleaned. The Contractor is responsible to make full restitution for any damages caused.

2. Protect all drain systems from the entrance of any paint removal or painting

debris.

3. Provide, design, erect and maintain all necessary platforms and staging required to accomplish the work and remove it upon project completion. All drawings, calculations, and assumptions shall be signed and sealed by a Professional Engineer licensed in the State of New Jersey and the Commonwealth of Pennsylvania. Conduct all platform inspections and maintain platform logs as required by OSHA. Exercise extreme care in fastening, bracing, and handling the scaffolding and staging to avoid scratching or damaging coated surfaces and surrounding property and equipment. The Contractor is responsible for the repair of any damage created at its own cost.

T.422.3 MATERIALS

A. PROTECTIVE COVERINGS AND CONTAINMENT

1. Supply all equipment and materials needed to contain all surface preparation dust and debris, over spray, paint spills, drips, and deposition of coating material to surfaces not intended to receive them. This may include, but is not limited to: ground covers, rigging, scaffolding, planking, water booms, containment screens or tarpaulin materials. Observe applicable containment requirements of Section T.422.4.1.

2. The Contractor is fully responsible for any damage caused to surrounding property including automobiles or boats. At the Contractor's option, car and/or boat covers can be provided for vehicles and boats within the likely dispersion zone of inadvertent releases of surface preparation dust/debris or paint spills/overspray.

B. CONTAINMENT DURING COATING APPLICATION

1. Unless approved by the Engineer in writing, apply all coats within an enclosure, and maintain the enclosed environment within the temperature limits specified by the coating manufacturer during application and drying.

2. Provide continuous ventilation during all painting and drying activities to evacuate the solvent fumes to maintain a safe working environment, and to facilitate the evaporation of solvents for proper curing of the paint film.

3. Exhaust the air through a filtration system (i.e., carbon filtration) to reduce odors to as low as practical outside of the containment.

4. When the painting enclosure is not weather tight with the interior ambient conditions controlled, do not apply paint when the ambient conditions at the time of painting are outside of the specified ranges, or when the National Oceanic Atmospheric Administration (NOAA) forecasts that precipitation, temperatures, dew point, or relative humidity outside of the specified ranges

would occur prior to the drying of the paint.

C. EQUIPMENT

Provide all equipment necessary to perform the work including necessary power supplies, even if equipment is not specifically designated in this Section.

D. COATING MATERIALS

1. Provide the type and quantity of coating materials required to paint all surfaces as identified in the scope of work. Verify that all coating materials are VOC (Volatile Organic Compound) compliant with regard to the regulations of both Pennsylvania and New Jersey. The specified three-coat paint system shall be one of the systems listed in NEPCOAT (NorthEast Protective Coating Committee) Qualified Products List B consisting of an Organic Zinc Rich Epoxy Primer, Epoxy Intermediate, and Aliphatic Urethane Finish. NEPCOAT systems have been tested under the National Transportation Product Evaluation Program (NTPEP) and meet specific performance criteria established by NEPCOAT. Stripe coats shall be applied for the primer and finish coats.

2. All materials must be approved by the Engineer in writing prior to application of the material. Examples of suitable NEPCOAT coating systems are found in Table 1. The Contractor may propose a substitute material of equivalent or better quality for the Engineer's review and approval, provided the system meets all the acceptance criteria established by NEPCOAT. The evaluation of any and all substitute materials as equivalent or better quality shall be at the sole discretion of the Engineer.

   Zinc-Rich Primer – This material shall be an organic, zinc-rich material, with a minimum of 77 – 85 % zinc dust in the dried film. Epoxy materials shall be used. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted. Material shall conform to SSPC Paint Specification, No. 20.

   Primer Stripe Coat – To be applied before or after the application of the prime coat to all edges, crevices, welds, rivets, and bolt threads/nuts. This material shall be the same as the primer coat. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.

   Intermediate Coat – Apply a full intermediate coat of an epoxy material. Lead and chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.

   Final Stripe Coat (Finish Coat applies to shop painting of new steel, but is not applicable to field painting of existing steel) - A stripe coat of the urethane

finish coat applied prior to the application of the full finish coat. The stripe coat is to be applied to all edges, crevices, welds, bolt threads and rivets (this stripe coat is applied to the same surfaces as the primer stripe coat). The material shall be the same as the final coat. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted.

Finish Coat (Finish Coat applies to shop painting of new steel, but is not applicable to field painting of existing steel) – A full aliphatic acrylic urethane finish coat. The total coating binder solids for two component urethane coating shall be made of at least 17% polyisocyanate (NCO) by weight. A minimum of 1% of a hindered amine light stabilizer shall be included in the formulations. Coatings containing lead and/or chromium, other than naturally occurring trace amounts associated with the coating pigments, are not permitted. The color of the finish coat shall be Walt Whitman Bridge Green. The finish coat shall match the color chip sample provided by the Engineer.

All finish coat materials shall have low gloss that matches the gloss of the finish coat applied to other sections of the bridge. A sample of the finish coat materials in the colors and gloss required shall be submitted to the Engineer for approval prior to application. It is imperative that all batches of the finish coat be produced in the same color and gloss. The allowed variation in color from the initial batch is +/- 1 delta E (ASTM D2244). The allowed variation in gloss from the initial batch is +/- 5 units (ASTM D523).

The highest quality raw materials shall be used for the manufacturing of each batch of each coat in order to maximize corrosion protection and to minimize fading, chalking, and color drift. Corrosion protection, color and gloss stability, and the overall long-term aesthetics of the paint system are of critical importance to this project. Color shift after 5 years shall not be greater than 2 delta E (ASTM D2244).

The products in the following Table 1 represent materials that appear to meet the minimum requirements for the material (VOC compliance, percentage of zinc in the primer, and NCO content of the finish) and are included in NEPCOAT Qualified Products List B. In the event of a conflict, the minimum requirements presented in T.422.3 shall prevail. Coating manufacturers are required to provide test data for each coat as identified in Table 1 together with color samples of the finish coat for review and acceptance prior to the use of any material.

TABLE 1. COATING SYSTEMS
Epoxy Zinc, Epoxy, Acrylic Urethane Finish Coats

	Carboline	International	PPG/Ameron	MAB	Sherwin Williams
Epoxy Zinc	Carbozinc 859	Interzinc 315HB	Amercoat 68HS	Ply-Tile Epoxy Organic Zinc Rich Primer 011230/231	Zinc-Clad III HS
Epoxy	Carboguard 888	Intergard 475HS	Amercoat 399	Ply-Mastic 650	Macropoxy 646
Aliphatic Acrylic Urethane*	Carbothane 133LH	Interthane 870 UHS	Amercoat 450H	Ply-Thane 890 HS	Acrolon 218 HS

*Finish Coat is not applicable to field painting of existing steel.

TABLE 2. DRY FILM THICKNESS FOR STEEL

Coat	DFT Range (mils)
Primer	3 to 5
Primer Stripe coat	2 to 4
Intermediate Coat	3 to 5
Finish Stripe Coat	1 to 2
Finish Coat	2 to 4
Total System DFT (Including stripe coats)	8 to 14 (11 to 20) for New Steel 6 to 10 (8 to 14) for Existing Steel

The total system DFT (Dry Film Thickness) with the exception of the stripe coat areas, and individual spot readings, is not to exceed 14 mils for new steel or 10 mils for the existing steel. SSPC PA-2 allows spot readings of 80% to 120% of the specified DFT. The total average for a given measured area must be within the specified range. The following Table summarizes dry film thickness requirements. If the selected manufacturer requires a different coating thickness, provide the Engineer with the discrepancy in writing and comply with the Engineer's written response.

3. Use the same manufacturer for all coats of the approved system, including thinners, additives and touch-up coatings. Do not co-mix coating products or components produced by different manufacturers under any circumstances.

4. Only use paint materials that are packaged in sealed, original, labeled

containers bearing the manufacturers name, type of material, brand name, color designation, shelf life, date of manufacture, batch number, and instructions for mixing and thinning.

5. The AUTHORITY reserves the right to test the coating materials at any time, and any number of times during the period of painting. The Engineer will sample the paint(s) being used.

(a) Unopened containers of each component of the paints at the construction site shall be selected for the analysis. At the discretion of the Engineer, in lieu of complete kits of material, representative pints or quarts can be transferred to metal containers, identified, sealed, and certified in the presence of the Contractor.

(b) The manufacturer is required to submit a color sample of the finish and the following parameters for their products before the work begins, and is required to provide the specific test results obtained for each batch of material shipped to the project. The AUTHORITY may conduct any or all of the following tests to evaluate the material upon receipt on site or at any time during the coating process. Material which does not comply with the parameters provided originally and/or the batch test results provided by the manufacturer will be rejected and cannot be used. The AUTHORITY also reserves the right to conduct any other testing deemed necessary to evaluate the quality of the paint materials.

- Viscosity (Stormer @ 25°C, Ku, ASTM D 562
- % Total Solids by Weight, ASTM D 2369
- Volatile Organic Compound (VOC), ASTM D 2369
- Weight per Gallon, ASTM D 1475
- Volume Nonvolatile Matter, ASTM D 2697
- Pigment Content, ASTM D 2371
- % Metallic Zinc in Primer by Differential Scanning Calorimetry
- 60° Specular Gloss of finish coat, ASTM D 523
- Infrared Identification - of individual components and of the mixed coating for 2 component materials. For the individual components, obtain each spectrum by sandwiching a small quantity (i.e., 1 to 2 drops) of material between two potassium bromide plates and obtaining a transmission infrared spectrum. For the mixed and cured material, use a potassium bromide pellet technique.
- Urethane Finish Coat - % NCO by weight based on total coating binder solids (per SSPC methods provided in Paint 36)

T.422.4 METHOD OF CONSTRUCTION

T.422.4.1 CONTAINMENT

A. This item includes the fabrication, installation, maintenance, movement, and removal of an SSPC Class 3P containment system(s) for vacuum-shrouded power tool cleaning. This item also includes those items needed to meet the requirements of this specification and the requirements of SSPC Guide 6 and Guide 16. Prepare separate submittals, containment plans, and structural analysis for each distinct work area. Containment shall be designed to withstand a 60 mph sustained wind load.

B. Use a containment system that maintains the work area free of emissions of dust and debris in accordance with all provisions of this specification.

C. Any paint debris resulting from the power tool cleaning operations shall be continuously removed from the floor of the containment during the paint removal operations. Accumulation of debris in excess of the design limitations of the platform shall result in immediate termination of cleaning and paint operations until all debris is removed to satisfaction of the Engineer.

D. Remove all debris from the containment materials, equipment, and the structure prior to relocation to another point along the structure. Clean to the extent that debris or dust is not dislodged by winds or physical contact during the dismantling, handling and transportation of the materials.

E. In the event of sustained wind speeds in excess of 60mph, or accumulating snows, drop those containment elements that could contribute to adding wind load to the bridge structure, excluding framing. Secure all materials, tools, and equipment when undertaking these activities.

F. In the event of extended shutdowns over holidays or other extended periods, inspect the containment and its components at least once each week. Repair, tighten, or remove materials as appropriate, or as directed by the AUTHORITY.

At all times, during the working and non-working hours, the Contractor shall have a crew immediately available to correct any potentially unsafe condition, including but not limited to repairing any deficiencies and/or defects, securing any torn or loose containment components and removing any excessive snow loadings to safeguard the structure, pedestrians, vehicular traffic and the general public.

G. Maximum containment limits for the project shall be based on the analysis conducted by the Contractor’s Engineer for the specific containment design being proposed. Install and use a containment system for the project based on the paint removal methods that will be utilized.

H. Use SSPC Class 3P containment for Power Tool Cleaning with vacuum shrouded power tools. Refer to Table 5 for the requirements of Class 3P.

I. Use SSPC Class 4W containment for the pressure water cleaning. Refer to Table 5 for the requirements of Class 4W.

TABLE 3. CONTAINMENT CRITERIA FOR REMOVAL OF PAINT (1)

Removal Method	SSPC Class (2)	Material Flexibility	Material Permeability (3)	Support Structure	Material Joints	Containment Entryway	Ventilation System Required	Negative Pressure Required	Exhaust Filtration Required
Power Tool w/ Vacuum	3P	Rigid or Flexible	Penetrable	Minimal	Partially Sealed	Open Seam	Natural	Not Required	Not Required
Wet methods (4)	4W	Rigid or Flexible	Water Permeable	Flexible	Partially Sealed	Open Seam	Natural	Not Required	Not Required

(1) This table provides general design criteria only. Other combinations of material may provide controls over emissions equivalent to those combinations shown above.
(2) The SSPC Classification is based on SSPC Guide 6.
(3) Permeability addresses both air penetrability and water permeability as appropriate.
(4) Class 4W will capture dislodged paint chips and debris, but will not contain water used for cleaning.

T.422.4.1.1 CONTAINMENT DRAWINGS AND CERTIFICATION OF INSTALLATION

A. Provide drawings and cut-sheets for all components of the containment and all suspended and loaded scaffolding, including calculations and assumptions. All drawings, calculations, and assumptions shall be signed and sealed by a Professional Engineer licensed in the State of New Jersey and the Commonwealth of Pennsylvania. Provide a complete structural impact analysis to verify that the existing structure can withstand the live and dead loads of the containment, including wind loads. Do not conduct any work involving the installation of these materials until the drawings and calculations have been reviewed and accepted by the Engineer.

B. After the initial containment system design is installed, have the containment design engineer, or a designee working on behalf of the design engineer, conduct a site inspection to verify that the system has been assembled as shown on the approved, signed and sealed drawings. Have the design engineer submit the letter to the Engineer attesting to the above. The letter must be received by the Engineer before any work within the containment can begin.

T.422.4.1.2 CONTAINMENT FLOORING SYSTEM AND ADDITIONAL COLLECTORS

A. A rigid platform system must be used above all active waterways. The rigid platform system shall extend a minimum of 10 feet in each direction beyond the channel line. A flexible containment system may be used in other locations with the approval of the Engineer.

B. When directed by the Engineer, provide ground covers around and beneath the containment area to capture inadvertent spills or leaks of debris. Extend the covers a minimum of 10 feet beyond the area covered by the containment. Debris shall be removed from the covers at least once per shift, or as directed by the Engineer.

T.422.4.1.3 CONTAINMENT COMPONENTS

A. The basic components that make up containment systems are defined below.

1. Rigidity of Containment Materials

Rigid containment materials consist of solid panels of plywood, aluminum, rigid metal, plastic, fiberglass, composites, or similar materials. Flexible materials consist of screens, tarps, drapes, plastic sheeting, or similar materials. Use fire retardant materials in all cases.

2. Permeability of Containment Materials

The containment materials are identified as air impenetrable if they are impervious to dust or wind such as provided by rigid panels, coated solid tarps, or plastic sheeting. Air penetrable materials are those that are formed or woven to allow air flow. Water impermeable materials are those that are capable of containing and controlling water when wet methods of preparation are used. Chemical resistant materials are those resistant to chemical and solvent stripping solutions.

3. Support Structure

Rigid support structures consist of scaffolding and framing to which the containment materials are affixed to minimize movement of the materials. Flexible support structures are comprised of cables, chains, or similar systems to which the containment materials are affixed. Minimal support structures involve the cables or connections necessary to attach the material to the structure being prepared and/or to the ground. Use fire retardant materials in all cases. The containment system is to be designed by a Professional Engineer licensed in the State of New Jersey and the Commonwealth of Pennsylvania and certifies the system has been installed in accordance with the design.

4. Containment Joints

Fully sealed joints require that mating surfaces between the containment materials and to the structure being prepared are completely sealed. Sealing measures include tape, caulk, Velcro, clamps, or other similar material capable of forming a continuous, impenetrable or impermeable seal. Partially sealed joints involve the mating of the materials to one another and to the structure being prepared with concern for the structural soundness of the joint, but without consideration for creating a continuous, impenetrable or impermeable

seal.

5. Entryway

   An airlock entryway involves a minimum of one stage that is fully sealed to the containment and which is maintained under negative pressure using the ventilation system of the containment. Re-sealable door entryways involve the use of flexible or rigid doors capable of being repeatedly opened and resealed. Sealing methods include the use of zippers, Velcro, clamps, or similar fasteners. Overlapping door tarpaulin entryways consist of two or three overlapping door tarpaulins. Open seam entryways involve entrance into the containment through any open seam.

6. Mechanical Ventilation

   The requirement for mechanical ventilation is to ensure that adequate air movement is achieved to reduce worker exposure to toxic metals to as low as feasible, and to enhance visibility. Design the system with proper exhaust ports or plenums, adequately sized ductwork, adequately sized discharge fans and air cleaning devices (dust collectors) and properly sized and distributed make-up air points. Natural ventilation does not require the use of mechanical equipment for moving dust and debris through the work area. It relies on natural air flow patterns, if any, through the containment.

7. Negative Pressure

   When negative pressure is specified, verify its performance through both instrument monitoring to achieve a minimum of 0.03 in. water column (W.C.) relative to ambient conditions, or and through visual assessments for the concave appearance of the containment enclosure. Conduct the instrument monitoring and visual assessments at least twice daily. For the instrument monitoring, use manometers or magnehelic gages.

8. Exhaust Ventilation

   When mechanical ventilation systems are used, provide filtration of the exhaust air, otherwise airborne particulate from the containment will be exhausted directly into the surrounding air. Provide a filtration efficiency of 99.97% at 0.5 microns or better. Equip all exhaust stacks with mass-flow tribosentry or equivalent bag leak detectors with a minimum detection limit of less than 0.02 grains/std cubic feet. Leak detectors must include an audible alarm that is automatically activated in the event of a leak.

T.422.4.1.4 CONTAINMENT LIGHTING REQUIREMENTS

A. Provide adequate lighting inside containment for all surface preparation, paint application, and inspection work. Maintain a minimum of 10 foot-candles for surface preparation and painting, and a minimum of 30 foot candles for inspection.

Light readings are measured at the surface. Demonstrate the adequacy of the lighting at the request of the Engineer. Increase the lighting if workers or inspectors have difficulty seeing. Use explosion-proof lighting.

T.422.4.1.5 PROTECTION OF DRAINAGE SYSTEMS

A. Protect storm sewers and drains from the entrance of debris from project activities. Keep all protective systems clean and operational throughout the entire project. At the end of each work day at a minimum, remove all visible debris from the protective devices or from areas where rain water could carry the debris into drains or storm sewers. Conduct more frequent cleaning as directed by the Engineer.

B. Identify the methods that will be used to route run-off from the existing deck drains through the containment enclosure. Do not close any bridge deck drains without the explicit approval of the Engineer.

T.422.4.2 SURFACE PREPARATION

A. GENERAL

1. Ambient Conditions – Do not conduct final surface preparation which exposes bare steel under damp environmental conditions or when the surface temperature is less than 5°F greater than the dew point temperature of the surrounding air.

B. SURFACE PREPARATION FOR NEW STEEL

1. Solvent Cleaning – Remove oil, grease and surface contamination from all new steel surfaces in accordance with SSPC-SP 1 prior to further surface preparation.

2. Compressed Air Cleanliness

(a) When compressed air is required for any operation, only use compressed air that is free from moisture and oil contamination.

(b) Verify the cleanliness of the compressed air by the white blotter test in accordance with ASTM D 4285 at least once per shift for each compressor system. Sufficient freedom from oil and moisture is confirmed if soiling or discoloration are not visible on the paper.

(c) If air contamination is evident, change filters, clean traps, add moisture separators or filters, or make adjustments as necessary to achieve clean, dry air.

3. Weld Spatter and Sharp Edges

(a) Remove slag, flux deposits, weld spatter and grind any resulting burrs

smooth.

(b) Prior to preparation, round sharp edges such as those created by flame cutting and shearing. The rolled edges of angles, channels, and wide flange beams do not require further rounding unless specifically directed by the Engineer.

4. For all steel surfaces designated to be blast cleaned completely remove all rust and mill scale and prepare the surface in accordance with SSPC-SP10/NACE No.2 “Near White Blast Cleaning.”

5. SSPC-VIS 1 may be used as an aid in defining the final surface appearance of a Near White Metal Blast Cleaned surface on the steel.

6. When recycled abrasive blast cleaning is selected, utilize recyclable steel grit abrasives and reclamation technology. Add new abrasives as needed or change the working mix to maintain a consistent profile depth and surface cleanliness. Comply with SSPC-AB2 for the cleanliness of the abrasive.

7. A surface profile of 1.5 to 3.5 mils, as shop measured with Testex replica tape or by other comparable methods, shall be obtained. If this range is unacceptable to the coating manufacturer, advise the Engineer in writing and comply with the Engineer’s written response.

C. SURFACE PREPARATION FOR EXISTING STEEL

1. Best engineering practices are to be used to prevent paint chips, dust, sediment, or any other debris from contaminating the environment. Surface preparation is to be performed by power tool cleaning using vacuum shrouded power tools to SP 15 as specified in the scope of work. Remove all bird litter prior to power tool cleaning in accordance with a Histoplasmosis Plan developed by the Contractor. Material removed must be contained and disposed of properly. Failure to contain and dispose of material or debris is cause for the AUTHORITY to suspend work until corrective actions are taken to allow work to resume in accordance with the specifications. No additional time or payment allowance will be made for such suspension of work.

2. CHLORIDE REMEDIATION

(a) Develop surface preparation procedures and processes that will remove chloride from the surfaces in addition to removing the paint, rust, and mill scale.

(b) Methods of chloride removal may include, but are not limited to: steam cleaning or pressure washing and scrubbing, or the use of proprietary chloride removal chemicals provided their use is approved by the coating manufacturer. Provide the proposed procedures for chloride remediation in the Surface preparation/painting plan in accordance with SP.23

Submittals.

(c) Upon completion of the surface preparation, test surfaces for chlorides in accordance with the Class A retrieval methods (cell or sleeve) of SSPC-Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and other Nonporous Substrates." Frequency of tests will be determined by the Engineer. Test representative surfaces which were previously rusted (i.e. pitted steel) for the presence of remaining chlorides.

(d) If chlorides are detected at levels greater than 7μg/cm2, continue to clean the affected areas until acceptable results are achieved.

(e) Following chloride testing of less than 7μg/cm2, power tool clean the surfaces, as applicable, to achieve the required surface preparation criteria.

3. COMMERCIAL GRADE POWER TOOWL CLEANING TO SSPC-SP 15

(a) For all surfaces designated to be cleaned using vacuum-shrouded power tools in accordance with SSPC-SP 15, "Commercial Grade Power Tool Cleaning," remove oil, grease and surface debris in accordance with SSPC-SP 1 prior to mechanical cleaning.

(b) Power tool clean the entire surface in accordance with SSPC-SP 15 to remove all existing coatings, mill scale, rust and other debris. Slight residues of rust and paint may be left in the bottoms of pits if the original surface is pitted. Use vacuum shrouded power tools such as rotary impact tools, needle guns, or other profile producing tools. The surface profile is to be as recommended by the manufacturer and in no case less than 1 mil.

4. AMBIENT CONDITIONS

Unless otherwise allowed by the Engineer, do not conduct final surface preparation which exposes the substrate under damp environmental conditions or when the surface temperature is less than 5° F greater than the dew point temperature of the surrounding air.

T.422.4.3 PAINT APPLICATION

A. PAINT STORAGE, MIXING, AND HANDLING

1. Keep all containers of paint unopened until required for use.

2. Store all paint, thinners, and solvents in accordance with the AUTHORITY's Safety Administrative Manual and OSHA regulations and the requirements of

the paint manufacturer. The most stringent requirements shall apply. Store the paint and solvents under cover, out of direct sunlight. Maintain the temperature between 40° F and 90° F, unless the requirements of the manufacturer are more restrictive. Contractor shall provide the paint and solvent storage plan, including proposed storage locations, to the Engineer for approval prior to use. Exposure to storage temperatures outside the range recommended in the manufacturer's specifications will be considered cause for rejection of the coating material.

3. Provide the size and number of fire extinguishers in proper proportion to the quantity of paint stored.

4. Do not permit smoking within 200' of paint storage, mixing, and application areas.

5. Do not open or mix paints in the storage area unless authorized by the Engineer.

6. Do not return mixed paints to the storage area.

7. Bulk containers for solvents and thinners must be equipped with spring-loaded, self-closing, dispensing nozzles. Use Underwriter's Laboratories approved containers for transporting paint to mixing areas.

8. Use explosion-proof lighting fixtures.

9. Do not permit the accumulation of empty paint cans, combustibles, and other debris.

10. Maintain Material Safety Data Sheets (MSDS) sheets for all materials.

B. MIXING AND THINNING OF COATING MATERIALS

1. Verify that the paint to be mixed has not exceeded its shelf life.

2. Utilize proper ventilation in the mixing area to prevent injury to workmen or the accumulation of volatile gases.

3. Mix all coatings in accordance with the requirements of the coating manufacturer. Use mechanical equipment such as a Jiffy mixer unless prohibited by the manufacturer.

4. Thin paints in strict accordance with the coating manufacturer’s written instructions. Use only those types, brands, and amounts of thinner recommended by the coating manufacturer. Limit the thinning to the minimum amount necessary to facilitate application.

5. Mix only complete kits of multiple component coating materials.

C. COATING APPLICATION

1. Surface Preparation - Verify that the surface exhibits the specified degree of cleaning immediately prior to painting. Apply coatings to exposed steel surfaces (power tool cleaned to bare metal) within 8 hours of completing surface preparation and on the same day as completing surface preparation, following all other requirements of this section. If the surface has degraded prior to paint application, re-clean the surface.

2. Grease/Oil - If grease or oil have become deposited on the bare substrate or on the surface of any of the applied coats, remove by solvent cleaning in accordance with SSPC-SP 1 prior to the application of the next coat.

   (a) Only use solvents that will not damage the substrate and that are acceptable to the coating manufacturer and the Engineer.

   (b) Collect and properly dispose of all residues.

   (c) Use clean clothes for the final wiping.

3. Surface Cleanliness - Thoroughly clean the surface of each coat prior to the application of the next to remove spent abrasive, dirt, dust, and other deleterious material.

4. Ambient Conditions - Apply coatings under the following conditions. Maintain the conditions until the coating is dried sufficiently to resist exposure to temperatures, humidity, and moisture outside of the specified conditions. If the requirements of the coating manufacturer are more restrictive or permit otherwise, advise the Engineer in writing and comply with the limitations established by the written approval of the Engineer.

   (a) Surface and Air Temperatures - Between 40° F and 110° F.

   (b) Relative Humidity - Less than 85%.

   (c) Dew Point - Surface temperature at least 5° F above the dew point temperature of the surrounding air.

   (d) Frost/Rain - Do not apply coatings to surfaces containing frost or during rain, fog, or similar conditions.

   (e) Remove and replace any paint that is exposed to unacceptable conditions (e.g. rain or dew) prior to adequate curing.

5. Methods of Application and Containment - Apply all coats by brush, roller, or spray according to the manufacturers recommendations. Conduct all spray application within a full containment to prevent the escape of overspray.

Immediately halt all spray operations if overspray is observed escaping the work area. Do not resume spray application until the cause of the problem is corrected. When using brush or roller application, install sufficient containment materials and drop cloths to collect all drips and spills.

Appropriately classified extinguishers must be available within and outside containment in sufficient number and at locations approved by the AUTHORITY.

Use filtration on exhaust air or other means to reduce the odor generated during coating application to as low as practical. Provide the Engineer with a written description of the proposed means of odor control for review and acceptance prior to use.

6. Monitoring of Lower Explosion Limit (LEL) Equipment

Monitoring for Lower Explosion Limit (LEL) will be required at a minimum of two locations within each enclosure used for paint application or where there is the use of any solvent or coating material. The location of the monitoring equipment shall be approved by the Engineer. The monitoring shall be full time during paint applications or use of solvents or coating material. The Contractor shall be responsible for providing and maintaining the LEL monitors and shall provide a plan for location calibration, use and monitoring for the Engineer's review in advance of the painting operations. The LEL monitors shall be equipped with audio and visual alarms both inside and outside the containment.

7. Explosion Proof Fixtures

All lights and electrical fixtures being used within the enclosures shall have to be explosion proof and shall be so certified. All spray equipment shall be properly grounded to eliminate any danger of any type of ignition.

8. Coverage, Continuity, and Stripe Coating

(a) Apply each coat to assure thorough wetting of the substrate or underlying coat, and to achieve a smooth, streamline surface relatively free of discontinuities. Shadow-through, pinholes, bubbles, skips, misses, lap marks between applications, variations in color or texture, or other visible discontinuities in any coat are unacceptable. Runs or sags may be brushed out while the material remains wet.

(b) Thoroughly coat all surfaces with special attention to hard-to-reach areas and irregular surfaces such as edges, corners, welds, crevices and rivets.

(c) Apply a primer stripe coat before or after the application of the full prime coat. Apply the stripe coat to all edges, welds, bolt threads/nuts, rivets, and crevices. If the stripe coat is applied prior to the full primer coat,

allow the stripe coat to stand for a minimum of 10 minutes prior to over-coating it with the full prime coat, unless a longer time is required by the coating manufacturer. The purpose is to provide inspection personnel with the opportunity to visually verify that a stripe coat has been applied as specified prior to covering it up with the full prime coat. If the primer stripe coat is applied after the full prime coat has been applied, allow the full prime coat to cure sufficiently to support foot traffic before applying the stripe coat.

Apply the intermediate coat after the primer and primer stripe coat have dried for over-coating in accordance with the manufacturer's instructions. Apply a stripe coat of the finish (if specified) coat to all edges, welds, crevices, bolt threads/nuts, and rivets prior to the application of the full urethane finish coat. Allow the stripe coat to stand for a minimum of 10 minutes prior to over-coating it with the full finish coat unless a longer time is required by the coating manufacturer.

Verify that the stripe coats are applied to increase coating thickness and coverage in these areas.

9. Apply each coat after the previous coat has been allowed to dry as required by the manufacturer's written instructions, but do not exceed 14 days in order to minimize the length of exposure to dust and contamination. If the manufacturer requires the application of subsequent coats in less than 14 days advise the Engineer in writing and comply with the manufacturers' requirements. If the 14 day recoat interval is exceeded, the entire surface shall be pressure washed and dried prior to painting. If, in the opinion of the Engineer, the cleaning by pressure washing is insufficient, the Contractor shall remove and replace the questionable coating at no cost to the AUTHORITY.

10. Coating Adhesion - If the application of any coat causes lifting of an underlying coat, or there is poor adhesion between coats or to the substrate, remove the coating in the affected area to adjacent sound, adherent, coating, and reapply the material.

11. Wet Film Thickness - Use wet film thickness gages in accordance with ASTM D4414 to verify the thickness of each coat at the time of application.

12. Dry Film Thickness

    (a) Apply each coat to the thickness specified in Table 2 of T.422.3, or according to manufacturers' recommendations as approved by the Engineer.

    (b) Measure the thickness of each coat applied to ferrous substrates using nondestructive magnetic dry film thickness gages. Comply with SSPC-PA 2 for the calibration and use of the gages, and the frequency of thickness measurements. Measure the thickness of each coat prior to the

application of the next in order to determine the thickness of the newly applied coating. At the option of the Engineer, the adhesion of the prime coat will be measured in accordance with ASTM D 3359, Test Method A. When the adhesion is tested, each test result shall equal or exceed scale 3A. Locations for adhesion tests shall be randomly selected. Test locations shall be in areas of least visibility in the completed structure and shall be touched up in an approved manner after completion of the test. When satisfactory test results are not obtained, additional adhesion tests shall be taken to determine the area of insufficient adhesion. If additional prime coat is required to provide the specified minimum thickness, the prime coat shall be applied as soon as possible, but within 24 hours of the initial application.

(c) If there are questions regarding the thickness of the applied coating or there are disputes regarding the non-destructive measurements of coating thickness on metal substrates, a Tooke Gage (destructive film thickness gage) may be used when authorized by the Engineer. Conduct measurements in accordance with ASTM D 4138, but limit its use to a minimum of locations. Mark and repair all damage created by the destructive testing.

(d) Apply additional coating in areas of insufficient thickness with care to assure that all repairs blend in with the surrounding material. Unless directed otherwise by the Engineer, remove excessive coating thickness and reapply the affected coat(s).

D. REPAIR OF DAMAGE TO COMPLETED COATING SYSTEM

1. Localized Damage - Prepare localized damage by solvent cleaning in accordance with SSPC-SP 1 followed by power tool cleaning:

(a) If the damage exposes the substrate, remove all loose material in accordance with SSPC-SP 11, and apply all coats.

(b) If the substrate is not exposed, clean in accordance with SSPC-SP 3. Use SSPC-SP 2 for surface preparation only upon approval of the Engineer. Re-apply the affected coats (intermediate and finish, or finish only).

(c) SSPC-VIS 3 may be used as an aid in defining the appearance of the steel after preparation.

(d) Any uncured coatings exposed to freezing, excess humidity, rain, snow, condensation or curing temperatures outside the range recommended by the manufacturer will be considered damaged. Damaged coatings shall be permitted to dry, then shall be removed and the surface blast cleaned and recoated at the Contractor’s expense.

2. Extensive Damage - Repair extensive damage to the coating by methods as directed by the Engineer.

3. Containment and Rigging Marks – Following removal of containment, prepare all damage, misses, or areas caused by the scaffolding, containment walls, and rigging marks and apply the effected coats.

T.422.4.4 HOUSEKEEPING

A. GENERAL

1. Conduct housekeeping daily to maintain the work site in a neat and orderly condition, and surrounding property, roadways, etc. free of project debris (e.g., surface preparation and paint debris, materials of construction, etc.).

2. At the end of each day at a minimum, haul empty paint cans and other debris to the approved waste storage area.

3. Promptly remove all paint drips, splashes, and over spray from surfaces not intended to be painted.

4. Upon project completion, remove all equipment and materials, correct any damage caused by the operation, and leave all surfaces in a clean and acceptable condition.

T.422.4.5 INSPECTION

A. CONTRACTOR'S INSPECTION

1. Furnish, until final acceptance of the coating system, all equipment and instrumentation needed to inspect all phases of the work.

2. Conduct and document the following minimum Quality Control inspections on a daily basis. Provide copies of all records to the Engineer weekly, or more frequently, if directed.

(a) General Project Information - project name, contractor name, superintendent or foreman, inspector, and date

(b) Work Location(s)

(c) Protective Coverings - coverings and containment in place, surrounding property free of project debris.

(d) Ambient Conditions - test results and test locations during surface preparation and painting.

(e) Compressed Air Cleanliness – time and location of tests.

(f) Surface Preparation - method(s) of preparation, equipment used, surfaces prepared, and quality of preparation (i.e., surface cleanliness and surface profile).

(g) Soluble Salts or Chlorides - method(s) of remediation and test results

(h) Coating Material and Thinner - product trade names and batch numbers mixed each day

(i) Coating Mixing Data - quantities mixed, method(s) of mixing, mixing times, thinner amounts.

(j) Application Data - locations coated, method(s) of application, equipment used, application times, dry times between coats, cleanliness between coats

(k) Coating Thickness - existing thickness, newly applied thickness (wet and dry), testing equipment used, frequency and location of measurements

(l) Appearance and Film Continuity - continuity and appearance (runs, sags, pinholes).

B. ENGINEER'S QUALITY ASSURANCE INSPECTION

1. The Engineer will provide Quality Assurance inspections to verify that any or all phases of the Work are in accordance with the requirements of this Section. Facilitate this inspection as required, including allowing ample time for the inspections and access to the work. Quality Assurance hold point inspections include, but are not limited to, surface preparation, pre-painting cleanliness, application of each coat including stripe coats, dry film thickness of each coat and total film thickness, film appearance and continuity.

2. No work will commence on a particular item until the requirements of the inspection hold points have been met for all preceding tasks and approved by the Engineer.

3. The presence or activity of the Engineer's Quality Assurance inspections in no way relieves the Contractor of the responsibility to comply with all provisions of this Section and to provide complete Quality Control inspections of its own.

T.422.4.6 WASTE CLASSIFICATION, HANDLING, AND DISPOSAL

A. This item includes the classification, handling, and disposal of all wastes generated by all activities associated with this contract. This includes, but is not limited to: abrasive blasting debris, paint chips, and other wastes from disturbance of the existing coatings or the surface preparation activity.

B. The Delaware River Port Authority and the Contractor are the co-generators of the hazardous waste for permitting purposes. The Authority will provide the unique, project specific EPA identification number, but the Contractor is responsible for the handling, storage, transportation and disposal of all wastes.

C. Conduct the work in strict accordance with Federal, state, and local regulations governing the handling, transportation and disposal of waste. The provisions of this specification are based on Federal requirements found in 40 CFR 261-268.

END OF SECTION

SECTION T.423 MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION – SIGNAL GANTRIES

T.423.1 GENERAL

T.423.1.1 DESCRIPTION

This work shall consist of furnishing, storing, installing, maintaining, moving and relocating short-term traffic control devices; controlling, warning, guiding, and protecting vehicular and pedestrian traffic affected by construction of the Project; restricting general public and construction vehicular traffic to approved routes; and prohibiting stopping and parking of vehicles adjacent to the work site. This item includes removal of temporary traffic control devices.

The Contractor shall submit Maintenance and Protection of Traffic Plans for the approval of the AUTHORITY and the applicable state or local agencies, including PennDOT, NJDOT, County of Camden, City of Gloucester and City of Philadelphia for all operations affecting traffic. The Contractor shall develop Maintenance and Protection of Traffic Plans for all lane closures required by this contract. The plans shall be prepared by a Professional Engineer licensed in the Commonwealth of Pennsylvania and State of New Jersey.

T.423.1.2 CONTRACTOR'S RESPONSIBILITY

Prior to submitting a bid, contact PennDOT and NJDOT, as necessary and as specified in the General and Special Provisions, to determine their traffic control requirements. Any costs, direct or indirect, which are not included in the bid will not be considered for payment.

If the approved methods of operations submitted by the Contractor are not strictly adhered to by the Contractor, the AUTHORITY shall have the right to order all work which, in the opinion of the AUTHORITY, will affect the maintenance and protection of traffic, to be discontinued. Such work shall not be resumed until the AUTHORITY is assured and satisfied that the Contractor will perform the work in conformity with the approved methods of operations.

The Contractor shall have no claim against the AUTHORITY for the losses or delays caused by such work stoppage.

The AUTHORITY reserves the right to require the Contractor to change traffic control signs and devices as required to improve traffic flow.

T.423.1.3 QUALITY ASSURANCE

All work shall conform to the latest version of the following:

a) Federal Highway Administration, U.S. Department of Transportation, Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition with revisions 1 and 2.

b) PennDOT Publication 35, Approved Construction Materials (Bulletin 15)

c) PennDOT Publication 111M, Traffic Control – Pavement Markings and Signing Standards (TC-8600 and TC-8700 Series), 2013

d) PennDOT Publication 212, Official Traffic Control Devices, 2006

e) PennDOT Publication 213, Temporary Traffic Control Guidelines, 2014

f) PennDOT Publication 234, Flagging Handbook, 2012

g) PennDOT Publication 236M, Handbook of Approved Signs, 2013

h) PennDOT Publication 408/2016, Highway Specifications

i) General Provision Article E.5.9

T.423.1.4 SUBMITTALS

1. Provide product data to the Engineer for approval for the temporary traffic control devices specified herein.

2. Provide certification for traffic control devices specified herein.

3. Submit traffic control plan to the Engineer for approval.

   Complete Traffic Control Plan Submissions are subject to the following review periods:

   (a) First Submission - Ten (10) working days

   (b) Subsequent Re-Submissions – Ten (10) working days

(c) Proposed Modification to the Approved Traffic Control Plan – The Contractor shall prepare and submit the revised Traffic Control Plan for review and approval prior to the implementation of the proposed modifications. – Five (5) working days

T.423.2 MATERIALS

T.423.2.1 TRAFFIC CONTROL DEVICES

A. Traffic control devices need not be new, but shall be in good condition, as approved by the Engineer. Prior to the commencement of work, traffic control devices shall be placed as shown on plans or as directed by the Engineer. They shall be kept clean and maintained in good condition. When no longer required for the project, the traffic control devices shall be removed and disposed of by the Contractor. Traffic Control Devices shall be in accordance with PennDOT Publication 35, Approved Construction Materials (Bulletin 15).

1. Construction Signs

Installation, dimensions, colors and details of signs shall follow the standards in the latest version of PennDOT Publication 212 - Official Traffic Control Devices, PennDOT Publication 213 - Temporary Traffic Control Guidelines, PennDOT Publication 236M - Handbook of Approved Signs and PennDOT Publication 111M - Traffic Control - Pavement Markings and Signing Standards (TC-8600 and TC-8700 Series).

Letters and numerals shall conform to the latest version of PennDOT Publication 236M - Handbook of Approved Signs and PennDOT Publication 111M - Traffic Control - Pavement Markings and Signing Standards (TC-8600 and TC-8700 Series).

All signs shall be erected and maintained in a substantial manner to be approved by the Engineer and shall be maintained so as to provide maximum visibility and legibility at all times.

Backing Material

Aluminum shall be flat sheet of 6061-T6 Alloy, 0.125 inches thick. Plywood or other materials shall not be acceptable unless approved by the Engineer.

Sign Faces

Reflective sheeting for the signs shall be orange "Scotchlite" No. 2884 as manufactured by Minnesota Mining and Manufacturing Company (3M) or approved equal.

Supports

Sign supports shall be well seasoned lumber, S4S, free of splits, knots and warp, or steel components subject to the approval of the Engineer.

Fastening

All signs shall be securely fastened to their supports with bolts, nuts and washers of aluminum (2024-T4 Alloy) or of galvanized carbon steel.

2. Drums

Drums shall be 36 inches high with a minimum diameter of 18 inches and ballasted with a maximum weight of 50 pounds. Ballast shall be located at approximately ground level. Drums shall be plastic, roll-proof barrels equipped with alternate orange and white stripes or pressure sensitive utility grade reflective sheeting, as manufactured by Royal Industries Sign Division or an approved equal. Drums shall meet the minimum requirements as specified in the "Manual on Uniform Traffic Control Devices". Drums used for lane closures or channelization must extend across the entire bridge.

3. Type B Warning Lights

Type B warning lights shall be in accordance with PennDOT Publication 212 - Official Traffic Control Devices and PennDOT Publication 213 – Temporary Traffic Control Guidelines.

4. Type C Warning Lights

Type C warning lights shall be in accordance with PennDOT Publication 212 - Official Traffic Control Devices and PennDOT Publication 213 – Temporary Traffic Control Guidelines.

5. Traffic Cones

The traffic cones used for channelization shall be twenty-eight (28) inches minimum in height, a minimum outer tip diameter of 1-3/4", a 7-1/2" minimum outer bottom diameter, and a minimum base diameter of 14 inches. Traffic cones shall be predominantly orange in color, made of rubber or plastic, and have 2 strips of reflective white sheeting separated by a 2" gap. The minimum weight shall be 7 pounds. Traffic cones shall meet the minimum requirements as specified in the "Manual on Uniform Traffic Control Devices". Cones used for lane closures or channelization must extend across the entire bridge.

6. Traffic Directors

The Engineer may require the Contractor to station traffic directors (also referred to as flaggers or flagmen) at certain locations, where in the judgment of the Engineer, conditions dictate that steps be taken to regulate and protect traffic. Traffic directors shall be trained flaggers, in good physical condition including sight and hearing, mentally alert, and shall have a courteous but firm manner, neat appearance and a sense of responsibility for the safety of the public. Over the uniform, traffic directors, and all workers, shall wear at all times, high-visibility safety apparel, specifically meeting ANSI/ISEA 107-2004 Class 3 requirements. The safety apparel shall be reflectorized for nighttime operations. When controlling traffic, traffic directors shall be equipped with STOP/SLOW paddles and shall follow the procedures stipulated for flaggers in PennDOT Publication 234 – Flagging Handbook and "Manual on Uniform Traffic Control Devices".

7. Truck-Mounted Attenuator

The Truck-Mounted Attenuator (TMA) shall be the hex foam truck-mounted attenuator manufactured by Energy Absorption System, Inc. or approved equal.

The attenuator shall have a minimum of 721 square inches of high intensity reflective sheeting toward the extremities on each side of the equipment. A minimum of 144 square inches of the sheeting shall be visible from each direction.

The TMA shall be attached to the traffic control truck in accordance with

the attenuator manufacturer's specifications and recommendations.

Units or parts of the TMA which are damaged or become inoperable during construction shall be repaired or replaced. A complete replacement module and the required components for full restoration shall be available at all times on the project without additional compensation.

The TMA shall be placed in front of each and every work zone. TMA's are required to protect each work crew located within the work zone. Multiple work crews separated by a distance of 300 feet or greater shall be protected by separate TMAs.

8. Nighttime Lighting

Prior to the start of nighttime operations, a temporary construction lighting plan shall be submitted for review and approval. The lighting plan shall specify the construction area to be lighted, the layout of the lighting units, and the illumination intensity of the lighting system with calculation to show minimum foot candles. The construction area is defined as the area in which any and all work related to the construction is on-going and is to be performed during the hours of darkness. No nighttime construction shall begin until the lighting plan is approved in writing by the Engineer.

Nighttime operations shall be illuminated by a lighting system consisting of mobile units of floodlights capable of providing the construction area with a minimum illumination intensity of 10 foot-candles. The lighting units shall be positioned such that they do not cause glare to drivers or any nearby homes. Floodlight lamps for the lighting system shall be mercury vapor.

Shop drawings of the lighting units shall be furnished in accordance with General Provisions E.23 and E.24. A foot-candle light meter shall be provided and be available for use by the Engineer during night time operations.

The lighting system shall be powered by a generator. Each generator shall have a fuel tank of sufficient capacity to permit operation of the lighting system for a minimum of continuous 12 hours.

All equipment used for nighttime operations shall have a minimum of 72

square inches of high intensity reflective sheeting toward the extremities of each side of the equipment. A minimum of 144 square inches of the sheeting shall be visible from each direction. All workers shall, during the hours of darkness, wear reflectorized garments as specified for traffic directors.

9. Shadow Vehicles/Traffic Control Truck

   The shadow vehicles shall be 33,000 GVW or larger and loaded to weigh a minimum of 20,000 pounds. If a Truck Mounted Attenuator is used, the weight of the shadow vehicle shall not exceed 20,000 pounds. Shadow vehicles shall be used in all cases to set up MPT patterns, escort the Contractor's truck(s), pattern changes, material deliveries, barrier moves, take down of MPT patterns, and as directed by the Engineer. The shadow vehicle shall have warning lights and a 360^{o} flashing yellow light.

   The mounting of the impact attenuator on the rear of the truck and the 4' x 8' illuminated flashing arrow on the bed of the truck shall be in accordance with the manufacturer's recommendations.

10. Type III Barricades

    Furnish and install Type III Barriers in accordance with PennDOT Publication 212 - Official Traffic Control Devices, PennDOT Publication 213 - Temporary Traffic Control Guidelines, PennDOT Publication 111M - Traffic Control - Pavement Markings and Signing Standards (TC-8600 and TC-8700 Series), and as shown on the Traffic Control Plans.

T.423.3 METHOD OF CONSTRUCTION

Prior to beginning construction, traffic control devices shall be placed where shown on the Traffic Control Plans or as directed by the Engineer. They shall be kept clean and maintained in good condition. When no longer required for the project, the traffic control devices shall be removed and stored off site by the Contractor.

Conform to the requirements specified in Section E.5.9 of the General Provisions and as specified herein.

T.423.3.1 TRAFFIC CONTROL COORDINATOR

A. Prior to the start of construction operations, the Contractor shall assign a supervisory-level employee to be the Traffic Control Coordinator. The duties and

obligations of the Traffic Control Coordinator can be fulfilled by one of the Contractor's supervisory level employees (such as a foreman or superintendent) who need not be assigned solely to these duties. The Engineer shall be notified as to the name and method of contacting the Traffic Control Coordinator on a 24-hour basis.

B. The Traffic Control Coordinator shall perform daily inspections and take all corrective action to ensure compliance with the Traffic Control Plan and other approved standards. Additionally, the Traffic Control Coordinator shall perform inspections within 8 hours of a storm event and take all corrective action to ensure compliance with the Traffic Control Plan and other approved standards. The Engineer shall be advised of the schedule of these inspections and be given the opportunity to join in the inspection. In addition, the duties of the Traffic Control Coordinator shall include, but shall not be limited to, the responsibility for ensuring the following:

- Set-up and removal of all traffic control devices in accordance with the Traffic Control Plan.
- Correction of deficiencies of traffic control devices. The Contractor will be assessed liquidated damages for failure to correct or replace damaged devices within two (2) hours of the discovery or notification by the Engineer.
- Repositioning traffic control devices displaced by traffic or construction equipment.
- Covering or uncovering signs as appropriate.
- Replacing batteries, light bulbs, control panels and other electrical components.
- Keeping all traffic control devices clean.
- Adding fuel and oil to power units for traffic control devices.
- Ensuring that all Contractor’s equipment and vehicles are properly stored and parked so as not to create a traffic hazard.
- Properly storing traffic control devices when not in use.

Separate payment will not be made for the Traffic Control Coordinator, but all costs thereof shall be included in the various pay items of contract work.

T.423.3.2 STAGING AND SEQUENCING OF CONSTRUCTION

A. DAILY SEQUENCE OF OPERATIONS

This project will be constructed using a process of weekday off-peak, weeknight

off-peak and extended weekend short-term lane closures. Short-term lane closures for weekday off-peak, weeknight off-peak, and extended weekend periods will only be permitted during the hours indicated in Special Provision SP.9 Hours of Operations.

The Contractor is responsible for maintaining traffic at all times adjacent to the work zone. The number of lanes which will be opened to traffic during a particular period of time will be as follows:

Period	Min # of Lanes Open to Traffic	
	Eastbound	Westbound
Weekday		
AM Peak	3	4
Off Peak	2	2
PM Peak	4	3
Overnight	1*	1*
Weekend		
Daytime	3	3
Overnight	1*	1*

*If only one lane of traffic is available, a standby tow truck is required.

Contractor shall be responsible for all traffic control, except shifting of the existing moveable barrier. Contractor shall coordinate shifting of the existing moveable barrier with the AUTHORITY. The AUTHORITY will shift the existing moveable barrier as required to accommodate the construction sequencing and traffic control plan.

Construction activities are to be restricted to only one of the following pairs of gantries at any given time: Gantries A and C, Gantries B and I, or Gantries D and J. The Contractor shall begin, perform, and acceptably complete all construction activities associated with one particular pair of gantries and will not be permitted to begin or perform any construction activities associated with any subsequent pair of gantries until 120 calendar days after obtaining acceptance and written approval of the previous pair by the AUTHORITY. The resetting and relocation of structure-mounted overhead signs are to take place before and after the main construction activities on each pair of gantries as noted in Section T.416 – Relocating and Resetting Existing Structure Mounted Signs – Signal Gantries.

The Contractor will not be permitted to start placing MPT devices for short-term lane closures until the beginning of the off-peak/overnight period, and must have completely removed all MPT devices at the end of the off-peak/overnight period

(off-peak/overnight periods are defined in Special Provision SP.9 – Hours of Operation).

If, as a result of the Contractor's operation, the number and configuration of lanes cannot be opened to traffic at the beginning of any peak period, liquidated damages will be assessed to the Contractor in accordance with Special Provision SP.5 – Time of Starting and Completing Work and Liquidated Damages.

B. OFF-PEAK/OVERNIGHT/EXTENDED WEEKEND LANE CLOSURES

Temporary (short-term) lane closures will be permitted as described herein. Every Thursday by noon, the Contractor shall submit his proposed plan for lane closures for the following week starting Monday for review and approval by the Engineer. Lane closures will not be permitted if the Contractor fails to notify the Engineer of their requested lane closure by this specified time. In the event of emergency traffic conditions, permission will not be granted for short term closures. A week will be considered as starting at 5:00 a.m. each Monday.

The number and configuration of temporary (short-term) lane closures permitted to be closed at this facility will be as specified in Special Provision SP.9 - Hours of Operation. Temporary lane closures for weekday off-peak, weeknight off-peak, and extended weekend periods will only be permitted during the hours indicated in Hours of Operation.

For seasonal restrictions on temporary lane closures, refer to Special Provision SP.9 -Hours of Operation. Off-Peak hours are subject to change due to "high impact" events and holidays, as defined in Special Provision SP.9 –Hours of Operation, which increase traffic volumes across the bridge. The AUTHORITY shall have final approval of off-peak hours.

The set-up/break-down of the temporary lane closure pattern must begin and end within the time periods indicated in Special Provision SP.9 - Hours of Operation.

No additional payment will be made by the AUTHORITY for work at night or on weekends and holidays.

C. COMPLETE ROADWAY CLOSURE

A complete closure of the roadway is required to remove a signal gantry or install a new signal gantry. Each complete roadway closure shall be limited to a 4 hour period, after which the roadway will be opened to clear any accumulated traffic. No closure shall be permitted on weekends and holidays. No complete closures

shall be permitted on the Walt Whitman Bridge except as noted below:

1. For the removal of existing signal gantries A, B, C, D, I, and J.

2. For the installation of new signal gantries A, B, C, D, I, and J.

The Contractor shall coordinate with PennDOT, NJDOT and AUTHORITY to ensure that the following message is placed on all permanent changeable message signs on all routes directly leading to the bridge for at least one week in advance of any proposed roadway closure:

WALT WHITMAN BR
TO BE CLOSED
XX/XX 12 AM-4 AM

The date XX/XX is to be expressed in mm/dd format. This message is to be phased as necessary with any other messages required during that time period in accordance with the MUTCD.

No roadway closure will be allowed if the Contractor has not first submitted and gained AUTHORITY and Engineer approval on the details and plans for the complete roadway closure, or if the above message has been displayed for less than one week.

D. TRAFFIC CONTROL PLANS

The Contractor shall prepare and submit a TCP sealed by a Professional Engineer (PE) registered in the Commonwealth of Pennsylvania and in the State of New Jersey to the Engineer for review and approval. The Contractor's TCP must be prepared in accordance with PennDOT Publication 212 and 213, MUTCD and the AUTHORITY requirements. The AUTHORITY requirements for the maintenance and protection of traffic are as follows:

- Closure of lanes for the entire length of the bridge is required, regardless of where the work zone is located;

- Truck Mounted Attenuators (TMA) are required to protect each work crew located within a short term lane closure. Work crews separated by a distance of 300 ft. or greater shall be protected by an additional TMA;

- Flashing arrow panels must be placed at the beginning of the closure and

prior to the work zone. An additional arrow panel is required at the crest of the bridge when work is performed on the downgrade.

- All advanced signing shall be in accordance with PennDOT specifications and the MUTCD.

Prior to the time the Contractor intends to start operations affecting traffic, the Contractor shall submit to the Engineer complete details of the methods he intends to use for the safe restriction to the movement of traffic required for his operations. Methods not approved will be returned for revision and shall be resubmitted for further review. The Contractor's methods submitted for approval shall include complete information, data and/or sketches covering the means proposed by the Contractor for the protection of the public and his own personnel and equipment, including layouts and schedules showing the anticipated lane closing, truck access points, locations of all devices for lane closing and protection of traffic, and anticipated dates and rates of progress of work. It is the Contractor's responsibility to use the appropriate work zone traffic control case or cases as outlined in PennDOT Publication 212 and 213 to set up the maintenance and protection of traffic pattern that is shown on the Traffic Control Plans. The Contractor shall submit to the Engineer for approval prior to commencement of work, the intended work zone traffic control case that is associated with the required traffic control pattern called for on the Traffic Control Plan.

If the approved methods of operations submitted by the Contractor are not strictly adhered to by the Contractor, the AUTHORITY shall have the right to order all work which, in the opinion of the AUTHORITY, affects the maintenance and protection of traffic, to be immediately discontinued. Such work shall not be resumed until the AUTHORITY is assured and satisfied that the Contractor will perform the work in conformity with the approved methods of operations. The Contractor shall have no claim against the AUTHORITY for the losses or delays caused by such work stoppage.

The AUTHORITY reserves the right to alter Approved Traffic Control Plans to better accommodate traffic.

The AUTHORITY's approval of traffic control plans and/or its failure to approve such plans shall in no way shift responsibility for traffic safety from the Contractor to the AUTHORITY, and the Contractor shall remain liable to indemnify and hold the AUTHORITY harmless from and against any loss, cost, or expense relating to such traffic control plans.

The Contractor shall be responsible for transporting all his personnel to and from enclosed or closed-off areas. Personal vehicles will not be permitted to be parked anywhere within AUTHORITY or private properties, except in areas designated by the AUTHORITY.

E. CONTRACTOR'S VEHICLES IN WORK AREAS

Whenever the Contractor's vehicles operate in lanes open to traffic, travel shall always be with and not across or against traffic.

Vehicles shall enter and leave work areas in a manner which will not be hazardous to or interfere with traffic. During lane closings when a flagman is not on duty, vehicles operated solely for the transportation of supervisory personnel, flagmen, or approved inspectors will be allowed access to the work site. Vehicles so employed will be required to be equipped with a revolving amber light, visible throughout 360 degrees. Vehicles shall not park or stop in roadways, except within the closed lane(s). The Contractor's vehicles will not be permitted to make U-turns across the roadway or in the Toll Plaza area. Any vehicle making any illegal turn will be subject to a summons by the Police and be subject to removal from the project site.

Points for leaving and re-entering the traffic flow shall be, in general, at the beginning and end of a lane closing or as approved by the AUTHORITY. Uniformed flagmen provided by the Contractor shall be on duty, where required, at all locations where and when the Contractor's vehicles leave or enter traffic. Each flagman shall be an intelligent, English speaking person, properly trained, instructed and experienced in flagman duties. Each flagman shall be subject to the approval of the AUTHORITY. Any flagman performing duties unsatisfactorily, in the opinion of the AUTHORITY, shall be immediately removed from duty as a flagman and shall be replaced by an approved flagman. Over the uniform, each flagman, and all workers, shall wear at all times, high-visibility safety apparel, specifically meeting ANSI/ISEA 107-2004 Class 3 requirements. The safety apparel shall be reflectorized for nighttime operations. The AUTHORITY shall have no obligation to supervise or review flagmen. The Contractor shall be solely liable for the actions or inactions of flagmen under all circumstances

The Engineer shall be notified one month in advance of a tentative date for establishing new traffic patterns. This date shall be finalized 10 working days prior to the establishment of the new traffic patterns resulting from stage construction and 15 working days prior to the establishment of a detour for the

closing of any roadways.

This access is subject to the following conditions:

1. This entrance/exit is for the convenience of the Contractor and is optional. The barrier shall be continuous when no entrance/exit is installed.

2. Only two (2) entrances/exits will be permitted in each stage.

3. The entrance/exit will only be permitted on one side of the work zone.

4. Distance between two construction entrances shall be 1,000 ft. minimum.

5. When the lane adjacent to the construction entrance/exit is opened to the traffic, the construction entrance/exit will be closed by placing barrels at a minimum of 10 ft spacing across the opening.

6. The Contractor shall install channelizing devices across the opening when the entrance/exit is no longer used.

7. The Contractor will be permitted to enter/exit the construction entrance/exit without closing the adjacent lane by conforming to the following requirements:

    - A police escort will ride behind all Contractor vehicles which will enter or exit the construction entrance/exit. The Contractor will give the police two hour advance notice to use the entrance/exit.

    - The entrance/exit shall not be used for large material deliveries or tractor trailer vehicles. Access is restricted to light vehicles (pick-up trucks).

    - The number of uses shall be limited to five entrances and five exits per eight hour shift.

    - Use of construction entrance/exit locations may only occur during off-peak periods.

T.423.3.3 MAINTAINING AND PROTECTING TRAFFIC

A. It is the intent of this Contract that traffic is maintained through the construction sites at all times. All lane and shoulder closures shall be accomplished in accordance with the terms specified. The Contractor is cautioned that the time durations listed therein for lane closures may be curtailed by the AUTHORITY at any time that such closures constitute a hazard to traffic.

B. It is the intent of this Contract that vehicular traffic be maintained at all times on AUTHORITY, State and local roads. Any deviation from existing traffic patterns shall require the permission of the AUTHORITY, State and/or Local authorities having jurisdiction.

C. Before beginning work on any phase of the project, the Contractor shall install all specified warning signs, barricades, lights and other devices necessary to protect the public during that phase of his operation.

All signs shall be erected and maintained in a substantial manner to be approved by the Engineer and shall be maintained so as to provide maximum visibility and legibility at all times.

Type B warning lights shall be provided and illuminated in accordance with PennDOT Publication 212 - Official Traffic Control Devices, PennDOT Publication 213 – Temporary Traffic Control Guidelines and the Traffic Control Plans.

During night time lane closures, channelizing devices with attached Type C warning light shall be placed (3) abreast across each lane closure at 250 foot intervals along the lane closure.

Storage batteries or other bulk power sources shall be located as far as practicable from the traveled way and at ground level.

D. The AUTHORITY reserves the right, whenever the Contractor fails to open the minimum number of traffic lanes required by the Contract, to order the Contractor off the roadway and to complete the work with its own forces or those of another Contractor when, in the judgment of the Engineer, such action is necessary to protect the interest of the AUTHORITY and the traveling public.

E. Roadways and shoulders in areas within which the Contractor has actually commenced construction operations and which are reserved for traffic shall be maintained by the Contractor, at their expense, free from obstructions and in a

smooth riding condition at all times, including seasonal shutdowns. However, snow removal will not be required of the Contractor. The Contractor shall coordinate their work with the snow removal work by the AUTHORITY.

F. Any damage to newly constructed or existing pavements within the limits of the Project or adjacent thereto, which in the opinion of the Engineer was caused by the Contractor's operations, shall be repaired by the Contractor as directed by the Engineer at the Contractor's expense or the repairs will be made by others and the cost of such repairs will be deducted from monies due the Contractor.

G. The Contractor is responsible for coordinating their lane closures with any adjacent contractors in order to avoid any conflicts.

H. The AUTHORITY reserves the right to enter upon the Project and, at its own expense, maintain the existing roadway and/or structures. This maintenance will be during the life of the Project, but will not include those items which are the Contractor's responsibility for the contract items of work for the accommodation of traffic. The AUTHORITY does not assume responsibility in any way for maintenance of traffic as a consequence of performing this roadway and/or maintenance.

I. Equipment and Material Storage. Comply with PennDOT Publication 212 - Official Traffic Control Devices and PennDOT Publication 213 - Temporary Traffic Control Guidelines.

J. Existing AUTHORITY Signs. Remove or cover existing warning, regulatory, guide and directional signs which conflict with the traffic control plan, as required to accommodate construction operations. Do not remove Stop or Yield signs, unless an alternate type of traffic control is provided, such as flaggers, temporary traffic signals, etc. Continue the alternate traffic control until the Stop and/or Yield signs are replaced. Stake or mark sign locations or locate signs on construction drawings before removing any signs. Reinstall existing warning signs at appropriate locations within 4 hours of their removal. With the exception of Stop or Yield signs as herein noted, reinstall existing regulatory, guide and directional signs at appropriate locations within 24 hours of their removal.

K. Barricades. Where specified or indicated, furnish and install barricades in accordance with PennDOT Publication 111M - Traffic Control – Pavement Markings and Signing Standards (TC-8600 and TC-8700 Series), PennDOT Publication 212 - Official Traffic Control Devices, and PennDOT Publication 213 - Temporary Traffic Control Guidelines, except, all barricades to have a

minimum of 270 square inches of reflective area facing traffic.

L. Any employees of the Contractor or other personnel associated with the performance of this Contract whose duties require them to be on foot will be required to wear safety vests of the type specified for Traffic Directors.

M. Whenever the Contractor's vehicles operate on any roadway which is open to traffic, travel flow shall always be with and not across or against the flow of such traffic. Vehicles shall not park or stop in roadways except within work areas. During permissible work hours for lane closings, when a Traffic Director is not on duty, automobiles operated solely for the inspectors will be permitted access to work sites provided that such vehicles are operated in a safe, non-hazardous manner. Contractor vehicles shall have a revolving amber light, visible throughout 360 degrees.

N. The Contractor shall coordinate electronic display of overhead lane-use signal gantries and CMS speed limits signs, portable changeable message signs, and overhead VMS with the AUTHORITY.

O. The Contractor shall coordinate Wide Load Restrictions on the Walt Whitman Bridge with DRPA Public Safety at (856) 968-3384 or (215) 218-3750 ext. 3384, and Larry Walton (DRPA) (215-218-3721).

END OF SECTION

SECTION T.424 – DEMOLITION OF CONDUITS FEEDING GANTRY FROM TOWERS – SIGNAL GANTRIES

T.424.1 GENERAL

T.424.1.1 SUMMARY

Section Includes

1. Demolition and removal of conduits feeding gantries from towers; and
2. Salvage of existing items to be reused or recycled.

T.424.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Authority ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.424.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.424.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of the demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Authority prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of the demolition.

T.424.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.424.1.6 FIELD CONDITIONS

A. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with the demolition.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during the demolition operations.

1. Maintain fire-protection facilities in service during the demolition operations.

T.424.1.7 WARRANTY

A. Notify warrantor on completion of the demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.424.2 MATERIALS

T.424.2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning the demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

T.424.3 METHOD OF CONSTRUCTION

T.424.3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting the demolition operations.

B. Review record documents of existing construction provided by Authority. Authority does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of the demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during the demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from the demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before the demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.424.3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.

1. Authority will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of the demolition and that maintain continuity of services/systems to other parts of building.

T.424.3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around the demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between the demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during the demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of the demolition.

T.424.3.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Locate the demolition equipment and remove debris and materials so as not to impose excessive loads on supporting floors.
2. Dispose of demolished items and materials promptly

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Engineer's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Authority.
4. Transport items to Authority's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during the demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during the demolition and cleaned and reinstalled in their original locations after the demolition operations are complete.

T.424.3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally disposes of them.

T.424.3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by the demolition operations. Return adjacent areas to condition existing before the demolition operations began.

END OF SECTION

SECTION T.425 – DEMOLITION OF CONDUITS ON GANTRIES – SIGNAL GANTRIES

T.425.1 GENERAL

T.425.1.1 SUMMARY

Section Includes:

1. Demolition and removal of conduits on gantries; and
2. Salvage of existing items to be reused or recycled.

T.425.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Authority ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.425.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.425.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of the demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Authority prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of the demolition.

T.425.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.425.1.6 FIELD CONDITIONS

A. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with the demolition.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during the demolition operations.

   1. Maintain fire-protection facilities in service during the demolition operations.

T.425.1.7 WARRANTY

A. Notify warrantor on completion of the demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.425.2 MATERIALS

T.425.2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning the demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

T.425.3 METHOD OF CONSTRUCTION

T.425.3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting the demolition operations.

B. Review record documents of existing construction provided by Authority. Authority does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of the demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during the demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from the demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before the demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.425.3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.

1. Authority will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of the demolition and that maintain continuity of services/systems to other parts of building.

T.425.3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around the demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between the demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during the demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of the demolition.

T.425.3.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Locate the demolition equipment and remove debris and materials so as not to impose excessive loads on supporting floors.
2. Dispose of demolished items and materials promptly

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Engineer's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Authority.
4. Transport items to Authority's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during the demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during the demolition and cleaned and reinstalled in their original locations after the demolition operations are complete.

T.425.3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally dispose of them.

T.425.3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by the demolition operations. Return adjacent areas to condition existing before the demolition operations began.

END OF SECTION

SECTION T.426 – DEMOLITION OF LOAD CENTER AND TRANSFORMERS – GANTRY - SIGNAL GANTRIES

T.426.1 GENERAL

T.426.1.1 SUMMARY

Section Includes:

1. Demolition and removal of load center and transformers on gantries; and
2. Salvage of existing items to be reused or recycled.

T.426.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Authority ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.426.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.426.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of the demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Authority prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of the demolition.

T.426.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.426.1.6 FIELD CONDITIONS

A. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with the demolition.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during the demolition operations.

   1. Maintain fire-protection facilities in service during the demolition operations.

T.426.1.7 WARRANTY

A. Notify warrantor on completion of the demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.426.2 MATERIALS

T.426.2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning the demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

T.426.3 METHOD OF CONSTRUCTION

T.426.3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting the demolition operations.

B. Review record documents of existing construction provided by Authority. Authority does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of the demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during the demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from the demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before the demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.426.3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.

1. Authority will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of the demolition and that maintain continuity of services/systems to other parts of building.

T.426.3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around the demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between the demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during the demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of the demolition.

T.426.3.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Locate the demolition equipment and remove debris and materials so as not to impose excessive loads on supporting framing.
2. Dispose of demolished items and materials promptly

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Engineer's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Authority.
4. Transport items to Authority's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during the demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during the demolition and cleaned and reinstalled in their original locations after the demolition operations are complete.

T.426.3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally disposes of them.

T.426.3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by the demolition operations. Return adjacent areas to condition existing before the demolition operations began.

END OF SECTION

SECTION T.427 ELECTRICAL SUPPORTS AND SEISMIC RESTRAINTS – SIGNAL GANTRIES

T.427.1 GENERAL

T.427.1.1 SUMMARY

This Section includes the following:

1. Hangers and supports for electrical equipment and systems; and
2. Seismic restraints for electrical equipment and systems.

T.427.1.2 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. IBC: International Building Code.
C. RGS: Rigid Galvanized Steel conduit.
D. RMC: Rigid metal conduit.
E. Seismic Restraint: A structural support element such as a metal framing member, a cable, an anchor bolt or stud, a fastening device, or an assembly of these items used to transmit seismic forces from an item of equipment or system to building structure and to limit movement of item during a seismic event.

T.427.1.3 SUBMITTALS

A. Product Data: Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of electrical support and seismic-restraint component used.
   1. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
   2. Annotate to indicate application of each product submitted and compliance with requirements.
B. Shop Drawings: Indicate materials and dimensions and identify hardware, including attachment and anchorage devices, signed and sealed by a qualified professional engineer. Include the following:
   1. Fabricated Supports: Representations of field-fabricated supports not detailed on Drawings.
   2. Seismic Restraints: Detail anchorage and bracing not defined by details or charts on Drawings. Include the following:
      a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
      b. Details: Detail fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their

strengths, and indicate directions and values of forces transmitted to the structure during seismic events.

c. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

C. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.
D. Welding certificates.
E. Qualification Data: For professional engineer and testing agency.
F. Field quality-control test reports.

T.427.1.4 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

T.427.1.5

A. Site Class as Defined in the IBC.
B. Select seismic use group for Project structure from four classifications defined in IBC Table 1604.5.
C. Assigned Seismic Use Group.

T.427.2 MATERIALS

T.427.2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

T.427.2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed under this Project, with a minimum structural safety factor of five times the applied force.
B. Steel Slotted Support Systems: Comply with MFMA-3, factory-fabricated components for field assembly.
   1. Available Manufacturers:
      a. Cooper B-Line; a division of Cooper Industries.
      b. ERICO International Corporation.
      c. Allied Support Systems; Power-Strut Unit.
      d. GS Metals Corp.

e. Michigan Hanger Co., Inc.; O-Strut Div.
f. National Pipe Hanger Corp.
g. Thomas & Betts Corporation.
h. Unistrut; Tyco International, Ltd.
i. Wesanco, Inc.
j. Or DRPA Approved Equal

2. Finishes:
   a. All Unistrut and accessories to be Type 316 Stainless Steel.
3. Channel Dimensions: Selected for structural loading and applicable seismic forces.

D. Raceway and Cable Supports: As described in NECA 1.

E. Conduit and Cable Support Devices: Stainless Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

F. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

G. Mounting, Anchoring, and Attachment Components in the Anchorages: Items for fastening electrical items or their supports to Anchorage's walls include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Available Manufacturers:
      1) Hilti, Inc.
      2) ITW Construction Products.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co. Inc.
      5) Or DRPA Approved Equal
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Available Manufacturers:
      1) Cooper B-Line; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc
      3) Hilti, Inc.
      4) ITW Construction Products.
      5) MKT Fastening, LLC.
      6) Powers Fasteners.
      7) Or DRPA Approved Equal
3. Concrete Inserts: Stainless Steel slotted-support-system units similar to MSS Type 18; complying with MFMA-3 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

H. Mounting and Attachment Components on Bridge Structure: Items for fastening electrical items or their supports to bridge structure surfaces include the following:
1. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
2. Through Bolts: Structural type, hex head, high strength. Comply with ASTM A 325.
3. Toggle Bolts: All-steel springhead type.
4. Hanger Rods: Threaded steel.

T.427.2.3 SEISMIC-RESTRAINT COMPONENTS

A. Rated Strength, Features, and Application Requirements for Restraint Components: As defined in reports by an agency acceptable to authorities having jurisdiction.
1. Structural Safety Factor: Strength in tension, shear, and pullout force of components used shall be at least five times the maximum seismic forces to which they will be subjected.

B. Angle and Channel-Type Brace Assemblies: Steel angles or steel slotted-support-system components; with accessories for attachment to braced component at one end and to building structure at the other end.

C. Cable Restraints: ASTM A 603, zinc-coated, steel wire rope attached to steel or stainless-steel thimbles, brackets, turnbuckles, swivels, and bolts designed for restraining cable service.
1. Available Manufacturers:
   a. Amber/Booth Company, Inc.
   b. Loos & Co., Inc.
   c. Mason Industries, Inc.
   d. Or Approved Equal
2. Seismic Mountings, Anchors, and Attachments: Devices as specified in Part 2 "Support, Anchorage, and Attachment Components" Article, selected to resist seismic forces.
3. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod, of design recognized by an agency acceptable to authorities having jurisdiction.
4. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to type and size of anchor bolts and studs used.

5. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to type and size of attachment devices used.

T.427.2.4 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
B. Materials: Comply with requirements of the following.
   1. ASTM A 325 and ASTM F 594 for "Stainless-Steel Bolts and Nuts".
   2. ASTM F 1554 and ASTM A 563 for Anchor Bolts.

T.427.3 METHOD OF CONSTRUCTION

T.427.3.1 APPLICATION

A. Comply with NECA 1 for application of hangers and supports for electrical equipment and systems, except if requirements in this Section are stricter.
B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   1. Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction
   2. Secure raceways and cables to these supports with two-bolt conduit clamps.
D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

T.427.3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 for installation requirements, except as specified in this Article.
B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, as permitted in NFPA 70.
C. Install seismic-restraint components using methods approved by the evaluation service providing required submittals for component.

D. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

E. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
   1. To New Concrete: Bolt to concrete inserts.
   2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
   3. To Existing Concrete: Expansion anchor fasteners.
   4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
   5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
   6. To Light Steel: Sheet metal screws.
   7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

F. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

T.427.3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

T.427.3.4 INSTALLATION OF SEISMIC-RESTRAINT COMPONENTS

A. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

B. Restraint Cables: Provide slack within maximums recommended by manufacturer.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams. Attachment locations to be reviewed by Engineer.

T.427.3.5 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Make flexible connections, such as LFMC, etc., in runs of raceways, cables, wireways, and cable trays where they cross expansion and seismic-control joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to electrical equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

T.427.3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Testing: Test pullout resistance of seismic anchorage devices.
   1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
   2. Schedule test with Authority, through Engineer, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
   3. Obtain Engineer's approval before transmitting test loads to structure. Provide temporary load-spreading members.
   4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
   5. Test to 90 percent of rated proof load of device.
   6. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
C. Record test results.

END OF SECTION

SECTION T.428 IDENTIFICATION FOR ELECTRICAL SYSTEMS – SIGNAL GANTRIES

T.428.1 GENERAL

T.428.1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

T.428.1.2 SUMMARY

B. Section Includes:
   1. Identification of power and control cables.
   2. Identification for conductors.
   3. Equipment identification labels.
   4. Miscellaneous identification products.

T.428.1.3 ACTION SUBMITTALS

C. Product Data: For each electrical identification product indicated.

D. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

E. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

T.428.1.4 QUALITY ASSURANCE

F. Comply with ANSI A13.1 and IEEE C2.

G. Comply with NFPA 70.

H. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

I. Comply with ANSI Z535.4 for safety signs and labels.

J. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

T.428.1.5 COORDINATION

K. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

L. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

M. Coordinate installation of identifying devices with location of access panels and doors.

N. Install identifying devices before installing acoustical ceilings and similar concealment.

T.428.2 PRODUCTS

T.16.2.1 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

T.428.1.1 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl-tape not less than 3 mils thick by 1 to 2 inches wide.

B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.

T.428.1.2 EQUIPMENT IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

T.428.1.3 CABLE TIES

A. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

T.428.1.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

T.428.3 EXECUTION

T.428.1.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.

G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.

T.428.1.2 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and hand holes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and hand holes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.

C. Control-Circuit Conductor Termination Identification: For identification at terminations provide self-adhesive vinyl labels with the conductor designation.

D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

E. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
   a. Controls with external control power connections.

F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

   a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
   c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
   d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.
d. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
e. Enclosed switches.
f. Enclosed controllers.
g. Contactors.

END OF SECTION

SECTION T.429 NOT USED

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SECTION T.430 AWG #6 CONDUCTORS – SIGNAL GANTRIES

T.430.1 GENERAL .

T.430.1.1 SUMMARY

A. This Section includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.430.1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Qualification Data: For testing agency.
C. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

T.430.1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the Inter-National Electrical Testing Association and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified by the Inter-National Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Section T.18.3.4.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with NFPA 70.

T.430.2 MATERIALS

T.430.2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.430.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.
   5. Anaconda
   6. National

7. Or DRPA Approved Equal.

B. Refer to Section T.430.3.1 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC.

T.430.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.
   6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.430.3 METHOD OF CONSTRUCTION

T.430.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

T.430.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

D. Support cables according to Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

T.430.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than spliced conductors.
    1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.430.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
C. Testing: Perform the following field quality-control testing:
    1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
    2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
D. Test Reports: Prepare a written report to record the following:
    1. Test procedures used.
    2. Test results that comply with requirements.
    3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION T.431 AWG #8 CONDUCTORS – SIGNAL GANTRIES

T.431.1 GENERAL .

T.431.1.1 SUMMARY

A. This Section includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.431.1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Qualification Data: For testing agency.
C. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

T.431.1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the Inter-National Electrical Testing Association and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified by the Inter-National Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in T.94.3.4.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with NFPA 70.

T.431.2 MATERIALS

T.431.2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.431.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.
   5. Anaconda
   6. National

7. Or DRPA Approved Equal.

B. Refer to Section T.19.3.1 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC.

T.431.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.
   6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.431.3 METHOD OF CONSTRUCTION

T.431.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

T.431.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

D. Support cables according to Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

T.431.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
    1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.431.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
C. Testing: Perform the following field quality-control testing:
    1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
    2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
D. Test Reports: Prepare a written report to record the following:
    1. Test procedures used.
    2. Test results that comply with requirements.
    3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION T.432 AWG #10 CONDUCTORS – SIGNAL GANTRIES

T.432.1 GENERAL .

T.432.1.1 SUMMARY

A. This Section includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.432.1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Qualification Data: For testing agency.
C. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

T.432.1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the Inter-National Electrical Testing Association and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified by the Inter-National Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Section T.20.3.4.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with NFPA 70.

T.432.2 MATERIALS

T.432.2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.432.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.
   5. Anaconda
   6. National

7. Or DRPA Approved Equal.

B. Refer to Section T.20.3.1 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC.

T.432.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.
   6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.432.3 METHOD OF CONSTRUCTION

T.432.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

T.432.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

D. Support cables according to Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

T.432.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than spliced conductors.
    1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.432.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
C. Testing: Perform the following field quality-control testing:
    1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
    2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
D. Test Reports: Prepare a written report to record the following:
    1. Test procedures used.
    2. Test results that comply with requirements.
    3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION T.433 MISCELLANEOUS CONDUCTORS – SIGNAL GANTRIES

T.433.1 GENERAL .

T.433.1.1 SUMMARY

A. This Section includes wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

T.433.1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Qualification Data: For testing agency.
C. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

T.433.1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the Inter-National Electrical Testing Association and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified by the Inter-National Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in T.16.3.4.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with NFPA 70.

T.433.2 MATERIALS

T.433.2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.433.2.2 CONDUCTORS AND CABLES

A. Available Manufacturers:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Southwire Company.
   5. Anaconda
   6. National

7. Or DRPA Approved Equal.

B. Refer to Section T.21.3.1 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC; solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN complying with NEMA WC.

T.433.2.3 CONNECTORS AND SPLICES

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. AMP Incorporated/Tyco International.
   3. Hubbell/Anderson.
   4. O-Z/Gedney; EGS Electrical Group LLC.
   5. 3M Company; Electrical Products Division.
   6. Or DRPA Approved Equal

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

T.433.3 METHOD OF CONSTRUCTION

T.433.3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

C. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

T.433.3.2 INSTALLATION

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

D. Support cables according to Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

T.433.3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
    1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

T.433.3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
C. Testing: Perform the following field quality-control testing:
    1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
    2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
D. Test Reports: Prepare a written report to record the following:
    1. Test procedures used.
    2. Test results that comply with requirements.
    3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION T.434 MISCELLANEOUS CONDUITS – SIGNAL GANTRIES

T.434.1 GENERAL

T.434.1.1 SUMMARY

A. This Section includes raceways electrical wiring.

T.434.1.2 DEFINITIONS

B. EMT: Electrical metallic tubing.

C. FMC: Flexible metal conduit.

D. LFMC: Liquid-tight flexible metal conduit.

T.434.1.3 SUBMITTALS

A. Product Data: For surface raceways.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

C. Shop Drawings: Signed and sealed by a qualified professional engineer.

1. Design Calculations: Calculate requirements for selecting seismic restraints.
2. Detail assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Method of attaching hangers to bridge structure.

D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures, cabinets, accessories, and components will withstand seismic forces defined in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

T.434.1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

T.434.1.5 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

T.434.2 MATERIAL

T.434.2.1 MANUFACTURERS

A. In other articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

T.434.2.2 METAL CONDUIT AND TUBING

A. Available Manufacturers :

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. Wheatland Tube Co.
9. Or DRPA Approved Equal

B. Rigid Galvanized Steel Conduit: ANSI C80.1.

C. Plastic-Coated Steel Conduit and Fittings: NEMA RN 1.

D. EMT and Fittings: ANSI C80.3.

1. Fittings: Compression type.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

T.434.2.3 FACTORY FINISHES

A. Finish: For surface raceway, wireway, provide manufacturer's standard prime-coat finish ready for field painting.

T.434.3 METHOD OF CONSTRUCTION

T.434.3.1 RACEWAY APPLICATION

A. Outdoors:
   1. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
   2. Utilize plastic coated galvanized rigid steel conduit for all other applications per ANSI C80.1.

B. Indoors:
   1. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
   2. Utilize plastic coated galvanized rigid steel conduit for all other applications.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

   1. Rigid Galvanized Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

T.434.3.2 INSTALLATION

A. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

    1. Run parallel or banked raceways together on common supports.
    2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

H. Conduits and fittings shall be joined with threaded connectors only.

    1. Use insulating bushings to protect conductors.

I. Terminations:

    1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
    2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

    1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
    2. Where otherwise required by NFPA 70.

L. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

M. Flexible Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

N. Grounding Conductors in Raceways: Install a separate, green, ground conductor in all raceways.

T.434.3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

T.434.3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION

SECTION T.435 1-INCH RGS CONDUIT – SIGNAL GANTRIES

T.435.1 GENERAL

T.435.1.1 SUMMARY

A. This Section includes raceways electrical wiring.

T.435.1.2 DEFINITIONS

B. RGS: Rigid galvanized steel conduit.

T.435.1.3 SUBMITTALS

A. Product Data: For surface raceways.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

C. Shop Drawings: Signed and sealed by a qualified professional engineer.

1. Design Calculations: Calculate requirements for selecting seismic restraints.
2. Detail assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Method of attaching hangers to building structure.
4. Size and location of initial access modules for acoustical tile.

D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures, cabinets, accessories, and components will withstand seismic forces defined in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

T.435.1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

T.435.1.5 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

T.435.2 MATERIAL

T.435.2.1 MANUFACTURERS

A. In other articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

T.435.2.2 RGS CONDUIT

A. Available Manufacturers :

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. Wheatland Tube Co.
9. Or DRPA Approved Equal

B. PVC Coated rigid steel conduit:
1. Comply with NEMA RN 1
2. Coating thickness: 0.040 inch, minimum

C. Fittings: NEMA FB 1; compatible with conduit and tubing materials.
1. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

T.435.2.3 FACTORY FINISHES

A. Finish: For surface raceway, wireway, provide manufacturer's standard prime-coat finish ready for field painting.

T.435.3 METHOD OF CONSTRUCTION

T.435.3.1 APPLICATION

A. Outdoors:

1. Exposed: PVC coated steel rigid conduit.
2. Concealed: PVC coated steel rigid conduit.

B. Indoors:

1. Damp or Wet Locations PVC coated steel rigid conduit

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Galvanized Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

T.435.3.2 INSTALLATION

A. Install horizontal raceway runs above water piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

H. Conduits and fittings shall be joined with threaded connectors only.

1. Use insulating bushings to protect conductors.

I. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

L. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

M. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

N. Grounding Conductors in Raceways: Install a separate, green, ground conductor in all raceways.

T.435.3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

T.435.3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION

SECTION T.436 2-INCH RGS CONDUIT – SIGNAL GANTRIES

T.436.1 GENERAL

T.436.1.1 SUMMARY

A. This Section includes raceways electrical wiring.

T.436.1.2 DEFINITIONS

B. RGS: Rigid galvanized steel conduit.

T.436.1.3 SUBMITTALS

A. Product Data: For surface raceways.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

C. Shop Drawings: Signed and sealed by a qualified professional engineer.

1. Design Calculations: Calculate requirements for selecting seismic restraints.
2. Detail assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Method of attaching hangers to building structure.
4. Size and location of initial access modules for acoustical tile.

D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures, cabinets, accessories, and components will withstand seismic forces defined in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

T.436.1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

T.436.1.5 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

T.436.2 MATERIAL

T.436.2.1 MANUFACTURERS

A. In other articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

T.436.2.2 RGS CONDUIT

A. Available Manufacturers :

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. Wheatland Tube Co.
9. Or DRPA Approved Equal

B. PVC Coated rigid steel conduit:
1. Comply with NEMA RN 1
2. Coating thickness: 0.040 inch, minimum

C. Fittings: NEMA FB 1; compatible with conduit and tubing materials.
1. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

T.436.2.3 FACTORY FINISHES

A. Finish: For surface raceway, wireway, provide manufacturer's standard prime-coat finish ready for field painting.

T.436.3 METHOD OF CONSTRUCTION

T.436.3.1 APPLICATION

A. Outdoors:

1. Exposed: PVC coated steel rigid conduit.
2. Concealed: PVC coated steel rigid conduit.

B. Indoors:

1. Damp or Wet Locations PVC coated steel rigid conduit

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Galvanized Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

T.436.3.2 INSTALLATION

A. Install horizontal raceway runs above water piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

H. Conduits and fittings shall be joined with threaded connectors only.

1. Use insulating bushings to protect conductors.

I. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

L. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

M. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

N. Grounding Conductors in Raceways: Install a separate, green, ground conductor in all raceways.

T.436.3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

T.436.3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION

SECTION T.437 4-INCH RGS CONDUIT – SIGNAL GANTRIES

T.437.1 GENERAL

T.437.1.1 SUMMARY

A. This Section includes raceways electrical wiring.

T.437.1.2 DEFINITIONS

B. RGS: Rigid galvanized steel conduit.

T.437.1.3 SUBMITTALS

A. Product Data: For surface raceways.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

C. Shop Drawings: Signed and sealed by a qualified professional engineer.

1. Design Calculations: Calculate requirements for selecting seismic restraints.
2. Detail assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Method of attaching hangers to building structure.
4. Size and location of initial access modules for acoustical tile.

D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures, cabinets, accessories, and components will withstand seismic forces defined in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

T.437.1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

T.437.1.5 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

T.437.2 MATERIAL

T.437.2.1 MANUFACTURERS

A. In other articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

T.437.2.2 RGS CONDUIT

A. Available Manufacturers :

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Anamet Electrical, Inc.; Anaconda Metal Hose.
4. Electri-Flex Co.
5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
6. LTV Steel Tubular Products Company.
7. Manhattan/CDT/Cole-Flex.
8. Wheatland Tube Co.
9. Or DRPA Approved Equal

B. PVC Coated rigid steel conduit:
1. Comply with NEMA RN 1
2. Coating thickness: 0.040 inch, minimum

C. Fittings: NEMA FB 1; compatible with conduit and tubing materials.
1. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

T.437.2.3 FACTORY FINISHES

A. Finish: For surface raceway, wireway, provide manufacturer's standard prime-coat finish ready for field painting.

T.437.3 METHOD OF CONSTRUCTION

T.437.3.1 APPLICATION

A. Outdoors:

1. Exposed: PVC coated steel rigid conduit.
2. Concealed: PVC coated steel rigid conduit.

B. Indoors:

1. Damp or Wet Locations PVC coated steel rigid conduit

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Galvanized Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

T.437.3.2 INSTALLATION

A. Install horizontal raceway runs above water piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

H. Conduits and fittings shall be joined with threaded connectors only.

1. Use insulating bushings to protect conductors.

I. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

L. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

M. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

N. Grounding Conductors in Raceways: Install a separate, green, ground conductor in all raceways.

T.437.3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

T.437.3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION

SECTION T.438 NOT USED

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SECTION T.439 DEMOLITION LIGHTING CONTROL AND ASSOCIATE WIRING – SIGNAL GANTRIES

T.439.1 GENERAL

T.439.1.1 SUMMARY

Section Includes:

1. Demolition and removal of lighting control and associate wiring; and
2. Salvage of existing items to be reused or recycled.

T.439.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Authority ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.439.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.439.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of the demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination of Authority's continuing occupancy of completed Work.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Authority prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of the demolition.

T.439.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.439.1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Authority as far as practical.

B. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with the demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Authority. Hazardous materials will be removed by Authority under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during the demolition operations.

   1. Maintain fire-protection facilities in service during the demolition operations.

T.439.1.7 WARRANTY

A. Notify warrantor on completion of the demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.439.2 MATERIALS

T.439.2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning the demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

T.439.3 METHOD OF CONSTRUCTION

T.439.3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting the demolition operations.

B. Review contract drawings. Authority does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of the demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during the demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from the demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before the demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.439.3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.

1. Contractor to coordinate with the Authority to shut off indicated services/systems.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of the demolition and that maintain continuity of services/systems to other parts of building.

T.439.3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around the demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between the demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during the demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of the demolition.

T.439.3.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Locate the demolition equipment and remove debris and materials so as not to impose excessive loads on supporting floors, or framing.

2. Dispose of demolished items and materials promptly

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Engineer's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Authority.
4. Transport items to Authority's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during the demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during the demolition and cleaned and reinstalled in their original locations after the demolition operations are complete.

T.439.3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally disposes of them.

T.439.3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by the demolition operations. Return adjacent areas to condition existing before the demolition operations began.

END OF SECTION

SECTION T.440 DEMOLITION GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES

T.440.1 GENERAL

T.440.1.1 SUMMARY

Section Includes:

1. Demolition and removal of gantry signage lighting; and
2. Salvage of existing items to be reused or recycled.

T.440.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Authority ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.440.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.440.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of the demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Authority prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of the demolition.

T.440.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.440.1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Authority as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with the demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Authority. Hazardous materials will be removed by Authority under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during the demolition operations.

   1. Maintain fire-protection facilities in service during the demolition operations.

T.440.1.7 WARRANTY

A. Notify warrantor on completion of the demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.440.2 MATERIALS

T.440.2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning the demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

T.440.3 METHOD OF CONSTRUCTION

T.440.3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting the demolition operations.

B. Review contract drawings. Authority does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of the demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during the demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from the demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before the demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.440.3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.

1. Authority will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of the demolition and that maintain continuity of services/systems to other parts of building.

T.440.3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around the demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between the demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during the demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of the demolition.

T.440.3.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Locate the demolition equipment and remove debris and materials so as not to impose excessive loads on supporting floors, or framing.
2. Dispose of demolished items and materials promptly

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Engineer's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Authority.
4. Transport items to Authority's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during the demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during the demolition and cleaned and reinstalled in their original locations after the demolition operations are complete.

T.440.3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally disposes of them.

T.440.3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by the demolition operations. Return adjacent areas to condition existing before the demolition operations began.

END OF SECTION

SECTION T.441 – DEMOLITION GANTRY LANE SIGNAL LIGHTING –SIGNAL GANTRIES

T.441.1 GENERAL

T.441.1.1 SUMMARY

Section Includes:

1. Demolition and removal of gantry lane signal lighting; and
2. Salvage of existing items to be reused or recycled.

T.441.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Authority ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.441.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.441.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of the demolition and removal work, with starting and ending dates for each activity. Ensure Authority's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Authority prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of the demolition.

T.441.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.441.1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Authority as far as practical.

B. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with the demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Authority. Hazardous materials will be removed by Authority under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during the demolition operations.

   1. Maintain fire-protection facilities in service during the demolition operations.

T.441.1.7 WARRANTY

A. Notify warrantor on completion of the demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.441.2 MATERIALS

T.441.2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning the demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

T.441.3 METHOD OF CONSTRUCTION

T.441.3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting the demolition operations.

B. Review contract drawings. Authority does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of the demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during the demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from the demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before the demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.441.3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be demolished.

1. Authority will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of the demolition and that maintain continuity of services/systems to other parts of building.

T.441.3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around the demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between the demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during the demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of the demolition.

T.441.3.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Locate the demolition equipment and remove debris and materials so as not to impose excessive loads on supporting floors, or framing.
2. Dispose of demolished items and materials promptly.

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Engineer's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Authority.
4. Transport items to Authority's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during the demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during the demolition and cleaned and reinstalled in their original locations after the demolition operations are complete.

T.441.3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Authority's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Authority's property and legally disposes of them.

T.441.3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by the demolition operations. Return adjacent areas to condition existing before the demolition operations began.

END OF SECTION

SECTION T.442 GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES

T.442.1 GENERAL

T.442.1.1 SUMMARY

Section includes the following:

A. Gantry signage luminaires with LED and drivers.

T.442.1.2 DEFINITIONS

A. CRI: Color-rendering index.
B. LED: Light emitting diode.
C. Luminaire: Complete lighting fixture, including ballast housing if provided.

T.442.1.3 SUBMITTALS

A. Product Data: For each luminaire, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:

1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
2. Details of attaching luminaires and accessories.
3. Details of installation and construction.
4. Luminaire materials.
5. Photometric data based on laboratory tests of each luminaire type, complete with indicated LED, drivers, and accessories.
6. For indicated luminaires, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
7. Drivers, including energy-efficiency data.
8. LED's, including life, output, and energy-efficiency data.
9. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.

B. Shop Drawings:

1. Wiring Diagrams: Power wiring.

C. Qualification Data: For agencies providing photometric data for lighting fixtures.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For luminaries, and luminaire lowering devices to include in emergency, operation, and maintenance manuals.

F. Warranty: Special warranty specified in this Section.

T.442.1.4 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with IEEE C2, "National Electrical Safety Code."

D. Comply with NFPA 70.

T.442.1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

1. Warranty Period for LED, Luminaire, Driver: Five years from date of substantial completion.

T.442.1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Drivers: Four (4) spares for each type and rating of driver installed.

T.442.2 PRODUCTS

T.442.2.1 MANUFACTURERS

T.442.2.2 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction. Optical assembly to meet IP-66 rating. Electrical to meet IP-65 rating.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Luminaire design and tested to comply with ANSI C136:31 2001 for 100,000 cycles at 3.0G acceleration.

G. The luminaire is safety listed to CSA-C22.2 number 250, wet location 40ºC.

H. The luminaire is ROHS compliant. Luminaire meets EMI compliance per FCC Title 47 CFR Part 15, Class A.

I. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during maintenance and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

J. Exposed Hardware Material: Stainless steel.

K. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

L. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

M. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

N. Driver life at 25ºC is 100,000 hours.

O. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and - tested luminaire before shipping. Where indicated, match finished process and color of support materials.

P. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Luminaire to pass humidity testing per IEC 60068-2-3 1987 and passed Temperature-Voltage Cycling.

T.442.2.5 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Division 16 Section "Raceways and Boxes." In concrete foundations, wrap conduit with 0.010-inch thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

T.442.2.6 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IESNA testing guide(s):
   a. IESNA LM-50, "Photometric Measurements of Roadway Lighting Installations."
   b. IESNA LM-52, "Photometric Measurements of Roadway Sign Installations."
   c. IESNA LM-64, "Photometric Measurements of Parking Areas."
   d. IESNA LM-72, "Directional Positioning of Photometric Data."

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION

SECTION T.443 GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES

T.443.1 GENERAL

T.443.1.1 SUMMARY

A. Installation of gantry lane signal lighting on gantries. The work includes the installation of wiring, conduit and electric boxes.

T.443.2 MATERIALS

T.443.2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

T.443.2.2 GANTRY SIGNAL LIGHTING

A. Available Manufacturers:
   1. Trans Tech Direct View LED Traffic Controller DOT2424RG-175
   2. Or DRPA Approved Equal

T.443.3 METHOD OF CONSTRUCTION

T.443.3.1 PROCEDURE

A. After construction of the new signal gantries, install at the locations as shown on the Contract Drawings.
   1. Ensure that the lane use control signals are installed in compliance with the Drawings, in terms of horizontal alignment and vertical clearance. The signal locations shall not be revised without the approval of the Engineer.
   2. Aim lane use control signals, as directed, toward a point approximately 150 feet in advance of the signal gantry, and in the center of the approaching travel lane to be controlled by that signal.
   3. Securely mount lane use control signals using appropriate mounting brackets where indicated.
   4. Securely cover lane use control signals with an opaque material that covers and hides displays from the view of traffic until the signal is put into operation.
      a. Use material that is sufficiently opaque to hide any lighted signal indication.
      b. Burlap may be used as a hood material if the signals are not lighted and will not be lighted until the hood is removed.
      c. Maintain the hood and replace or repair the hood if it becomes loose, torn or removed.

END OF SECTION

SECTION T.444 SPECIAL SYSTEMS DEMOLITION – SIGNAL GANTRIES

THIS SPECIFICATION PERTAINS TO THE FOLLOWING ITEMS:

T.444A DEMOLITION FIBER OPTIC CONDUIT ON GANTRIES
T.444B DEMOLITION DEAD CABLES AND BOXES ALONG CATWALK

T.444.1 GENERAL

T.444.1.1 SUMMARY

A. Demolition of fiber optic conduit on gantries.

T.444.1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

T.444.1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

T.444.1.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property**,** for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

D. Pre-demolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

T.444.1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

T.4442.1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

   1. Maintain fire-protection facilities in service during selective demolition operations.

T.444.1.8 WARRANTY

F. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

T.444.2 METHOD OF CONSTRUCTION

T.444.2.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to perform an engineering survey of condition of the bridge to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.
2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing structural elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

T.444.2.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

T.444.2.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect equipment that has not been removed.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

T.444.2.4 DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with demolition systematically, from higher to lower level. Complete selective demolition operations above each tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly

B. Reuse of Structural Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish structural elements beyond what is indicated on Drawings without Architect's approval.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area off-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

T.444.2.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally disposes of them.

T.444.2.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION T.445 CAMERA REMOVAL-RESETTING – SIGNAL GANTRIES

T.445.1 GENERAL

T.445.1.1 SUMMARY

Section Includes:
A. Removal of cameras;
B. Storage of cameras; and
C. Reinstallation of cameras.

T.445.3 METHOD OF CONSTRUCTION

T.445.3.1 PROCEDURE

A. Disconnect communication and power cabling from existing CCTV cameras in indicated locations across span.
B. Carefully remove existing cameras and place into a controlled storage environment. Storage method shall protect cameras from physical damage and shall maintain a temperature and humidity level within the acceptable storage limits of each camera.
C. At the required construction stage as indicated on Drawings, remove cameras from storage and reinstall at locations shown on Drawings.
D. Reconnect communication and power cabling.
E. Visually inspect camera placement, cable termination, grounding and bonding, and labeling of all components.

END OF SECTION

SECTION T.446 24 STRAND SM OUTSIDE PLANT FOC – SIGNAL GANTRIES

T.446.1 GENERAL

T.446.1.1 SUMMARY

Section Includes:

a. Pathways.
b. Optical fiber cabling.
c. Cable connecting hardware.
d. Cabling identification products.

T.446.1.2 DEFINITIONS

BICSI: Building Industry Consulting Service International.
EMI: Electromagnetic interference.
IDC: Insulation displacement connector.
LAN: Local area network.
RCDD: Registered Communications Distribution Designer.

T.446.1.3 PERFORMANCE REQUIREMENTS

General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

T.446.1.4 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings:

1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
3. Cabling administration drawings and printouts.
4. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

C. Qualification Data: For Installer, qualified layout technician, installation Supervisor, and field inspector.
D. Source quality-control reports.
E. Field quality-control reports.
F. Maintenance Data: For splices and connectors to include in maintenance manuals.

T.446.1.5 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
   1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
   2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
   3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
B. Testing Agency Qualifications: An NRTL.
   1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
E. Grounding: Comply with ANSI-J-STD-607-A.

T.446.1.6 DELIVERY, STORAGE, AND HANDLING

Test cables upon receipt at Project site.

A. Test optical fiber cable to determine the continuity of the strand end to end. Use optical loss test set.
B. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.

T.446.2 MATERIALS

T.446.2.1 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A.
B. Cable Support: NRTL labeled for support of Category 3 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
   1. Support brackets with cable tie slots for fastening cable ties to brackets.
   2. Lacing bars, spools, J-hooks, and D-rings.
   3. Straps and other devices.
C. Conduit and Boxes: Flexible metal conduit shall not be used.

T.446.2.2 12 STRAND SINGLE-MODE OPTICAL FIBER CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
   1. Hubbell (Basis of Design)
   2. SYSTIMAX Solutions; a CommScope Inc. brand.
   3. Siemon
   4. Or DRPA Approved Equal.

B. General Description: Single-mode, nonconductive, loose tube (unless noted otherwise), outdoor, optical fiber cable.
   1. Comply with ICEA S-83-596 for mechanical properties (unless noted otherwise).
   2. Comply with TIA/EIA-568-B.1 for performance specifications.
   3. Comply with TIA/EIA-568-B.2
   4. Comply with IEEE 802.3 standard for 10 Gb/s Ethernet transmission at 1310nm and 1550nm window.

C. Indoor/Outdoor 10G Single-mode Fiber Optic Cable: 8.3/125-micrometer, laser-optimized single-mode optical fiber, capable of 10-Gigabit Ethernet transmission up to 6560 feet (2000 meters), for use in indoor/outdoor applications.
   1. Strand Count: 12
   2. Maximum Attenuation: 0.7 dB/km at 1310 nm; 0.7 dB/km at 1550 nm.
   3. Flame Rating: OFNP
   4. Acceptable Products:
      a. Hubbell HFCH3012BKS – OptiChannel Outdoor
      b. SYSTIMAX
      c. Siemon
      d. Or DRPA Approved Equal
   5. Innerduct Required: Yes (unless otherwise noted)

D. Jacket:
   1. Jacket Color: Black (unless noted otherwise)
   2. Cable cordage jacket, fiber, unit, and group color shall be according to

TIA/EIA-598-B.

3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

E. All fiber optic cables shall be furnished with the quantity of fiber as designated on the contract drawings. All fibers in a cable run shall be from the same manufacturer and shall be the same type. A mix of fibers from different manufactures shall not be used.

T.446.2.3 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Hubbell (Basis of Design)
   2. Molex Premise Networks; a division of Molex, Inc.
   3. Siemon Co. (The).
   4. Or DRPA Approved Equal
B. Cable Connecting Hardware:
   1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
   2. Quick-connect, simplex and duplex, Type LC connectors or as noted on plan. Insertion loss not more than 0.75 dB.
   3. Type SFF connectors may be used in termination racks, panels, and equipment packages.

T.446.2.4 OPTICAL FIBER CONNECTORS

A. Connector, SC
   1. Pre-polished SC connectors shall require no field polishing and require no adhesives for termination.
   2. Pre-polished fiber connector basic design shall be a factory pre-polished SC-style optical fiber connector with a zirconium ceramic ferrule.
   3. Index-matching gel is factory injected into the cleaved fiber stub splice to minimize connector insertion loss.
B. Connector, LC
   1. Pre-polished LC connectors shall require no field polishing and require no adhesives for termination.
   2. Pre-polished fiber connector basic design shall be a factory pre-polished LC-style optical fiber.
   3. Index-matching gel is factory injected into the cleaved fiber stub splice to minimize connector insertion loss.
   4. LC fiber connectors, properly installed onto qualified cable shall exceed the mechanical and environmental performance requirements of ANSI/TIA/EIA-568-3.D and shall meet the 10 GB/S ethernet performance requirements of IEEE802.3.
C. Connectors to be Sumitomo Lynx2 series.

T.446.2.5 FIBER ADAPTER PANELS

A. Optical fiber adapter panels shall be a modular design powder coated stamped metal construction, available in SC, ST, LC, and MT-RJ adapter configurations.
B. Adapter panels shall have quick release snap fasteners to fit directly into fiber enclosure.
C. Fiber patch panels shall be:
   1. Hubbell FSP series panels
   2. Or DRPA Approved Equal

T.446.2.6 INNERDUCT

A. Fiber optic cable shall be installed within innerduct for protection of fiber cables in a shared pathway.
B. The innerduct will be rated for the environment that it is being installed in.
C. Size to be 1”, pre-threaded with pull line.
D. Innerduct shall be:
   1. Premier Conduit.
   2. Or DRPA Approved Equal

T.446.2.7 IDENTIFICATION PRODUCTS

Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

T.446.2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.
B. Factory test cables on reels according to TIA/EIA-568-B.1.
C. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
D. Cable will be considered defective if it does not pass tests and inspections.
E. Prepare test and inspection reports.

T.446.3 METHOD OF CONSTRUCTION

T.446.3.1 INSTALLATION OF CABLES

A. Comply with NECA 1.
B. General Requirements for Cabling:
   1. Comply with TIA/EIA-568-B.1.
   2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
   3. Terminate all conductors; no cable shall contain unterminated elements.
   4. Cables may not be spliced unless otherwise indicated. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
   5. Install lacing bars to restrain cables, to prevent straining connections, and

to prevent bending cables to smaller radii than minimums recommended by manufacturer.

6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
9. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. Optical Fiber Cable Installation:
   1. Comply with TIA/EIA-568-B.3.
   2. Cable may be terminated on connecting hardware that is rack or cabinet mounted.
D. Group connecting hardware for cables into separate logical fields.
E. Separation from EMI Sources:
   1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
   2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
      a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
      b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
      c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
   3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
      a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
      b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
      c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
   4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
      a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
      b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
      c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
   5. Separation between Communications Cables and Electrical Motors and

Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

T.446.3.2 IDENTIFICATION

Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following: Cables use flexible vinyl or polyester that flexes as cables are bent.

END OF SECTION

SECTION T.447 TESTING FOR FIBER – SIGNAL GANTRIES

T.447.1 GENERAL

T.447.1.1 SUMMARY

Section Includes:
A. Optical Fiber Testing

T.447.1.2 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
   1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
   2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
   3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
B. Testing Agency Qualifications: An NRTL.
   1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
E. Grounding: Comply with ANSI-J-STD-607-A.

T.447.2 METHOD OF CONSTRUCTION

T.447.2.1 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
B. Perform tests and inspections.
C. Tests and Inspections:
   1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
   2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
   3. Optical Fiber Cable Tests:
      a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
      b. Link End-to-End Attenuation Tests:
         1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.

2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

D. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
E. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
F. End-to-end cabling will be considered defective if it does not pass tests and inspections.
G. Prepare test and inspection reports.

END OF SECTION

SECTION T.448 FIBER OPTIC SPLICE CASE – SIGNAL GANTRIES

T.448.1 GENERAL

T.448.1.1 SUMMARY

A. This work is the furnishing and installation of two fiber optic splice enclosures.

T.448.1.2 PERFORMANCE REQUIREMENTS

General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

T.448.1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings:
   1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
   2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
   3. Cabling administration drawings and printouts.
   4. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
C. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
D. Source quality-control reports.
E. Field quality-control reports.
F. Maintenance Data: For splices and connectors to include in maintenance manuals.

T.448.1.4 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
   1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
   2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
   3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
B. Testing Agency Qualifications: An NRTL.
   1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
E. Grounding: Comply with ANSI-J-STD-607-A.

T.448.2 MATERIALS

T.448.2.1 SPLICE ENCLOSURE

A. General Requirements: Comply with TIA/EIA-569-A.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Corning Cable Systems; or
   2. DRPA Approved Equal
C. Product: QFMPSC144S - Metal Premises Splice Cabinet

T.448.2.2 SPLICE TRAY

A. General Requirements: Comply with TIA/EIA-569-A.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Corning Cable Systems; or
   2. DRPA Approved Equal
C. Product: A0391180- FiberManager Fusion Splice Cassette (Splice Pak splice protector)

T.448.2.3 IDENTIFICATION PRODUCTS

Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

T.448.2.4 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.
B. Factory test cables on reels according to TIA/EIA-568-B.1.
C. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
D. Cable will be considered defective if it does not pass tests and inspections.
E. Prepare test and inspection reports.

T.448.3 METHOD OF CONSTRUCTION

T.448.3.1 IDENTIFICATION

Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following: Cables use flexible vinyl or polyester that flexes as cables are bent.

T.448.3.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
B. Perform tests and inspections.
C. Tests and Inspections:
   1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance

with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.

2. Visually inspect cable placement, cable termination, grounding and bonding, and labeling of all components.
3. Optical Fiber Cable Tests:
    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:
        1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
        2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

D. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
E. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
F. End-to-end cabling will be considered defective if it does not pass tests and inspections.
G. Prepare test and inspection reports.

END OF SECTION

SECTION T.449 FUSION SPLICING – SIGNAL GANTRIES

T.449.1 GENERAL

T.449.1.1 SUMMARY

A. This work includes the fusion splicing of fiber option cables.

T.449.1.2 PERFORMANCE REQUIREMENTS

General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

T.449.1.3 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
   1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
   2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
   3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
B. Testing Agency Qualifications: An NRTL.
   1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
E. Grounding: Comply with ANSI-J-STD-607-A.

T.449.2 METHOD OF CONSTRUCTION

T.449.2.1 FUSION SPLICING OF CABLES

A. Provide fusion splicing as noted on plans.

T.449.2.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
B. Perform tests and inspections.
C. Tests and Inspections:
   1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
   2. Visually inspect cable placement, cable termination, grounding and bonding, and labeling of all components.
   3. Optical Fiber Cable Tests:

a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
b. Link End-to-End Attenuation Tests:
    1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
    2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

D. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
E. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
F. End-to-end cabling will be considered defective if it does not pass tests and inspections.
G. Prepare test and inspection reports.

END OF SECTION

SECTION T.450 INNERDUCT – SIGNAL GANTRIES

T.450.1 GENERAL

T.450.1.1 SUMMARY

Section Includes:
A. Pathways; and
B. Cabling identification products.

T.450.1.2 DEFINITIONS

BICSI: Building Industry Consulting Service International.
EMI: Electromagnetic interference.
IDC: Insulation displacement connector.
LAN: Local area network.
RCDD: Registered Communications Distribution Designer.

T.450.1.3 SUBMITTALS

A. Product Data: For each type of product indicated; and
B. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

T.450.1.4 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
   1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
   2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
   3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
B. Testing Agency Qualifications: An NRTL.
   1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
E. Grounding: Comply with ANSI-J-STD-607-A.
F. Test cables upon receipt at Project site. Test each pair of UTP cable for open and short circuits.

T.450.2 MATERIALS

T.450.2.1 INNERDUCT

A. Description: High density polyethylene corrugated innerduct

1. Nominal I.D.: Greater than or equal to 1”
2. Nominal O.D.: Less than or equal to 1.35”

B. Color shall be orange for all innerducts which are installed with cabling. For any empty innerducts being installed as spares, color shall be non-orange (blue, black, green).

T.450.2.2 IDENTIFICATION PRODUCTS

Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

END OF SECTION

SECTION T.451 PANELBOARDS – SIGNAL GANTRIES

T.451.1 GENERAL

T.451.1 SUMMARY

Section includes the following:

A. Distribution panelboards; and
B. Lighting and appliance branch-circuit panelboards.

T.451.1.2 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. RFI: Radio-frequency interference.

D. RMS: Root mean square.

E. SPDT: Single pole, double throw.

T.451.1.3 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

a. Enclosure types and details for types other than NEMA 250, Type 1.
b. Bus configuration, current, and voltage ratings.
c. Short-circuit current rating of panelboards and overcurrent protective devices.
d. UL listing for series rating of installed devices.
e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

2. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that panelboards, overcurrent protective devices, accessories, and components will

withstand seismic forces defined in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries." Include the following:

1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements

D. Qualification Data: For testing agency.

E. Field quality-control test reports including the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

G. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

T.451.1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of panelboards and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with NEMA PB 1.

F. Comply with NFPA 70.

T.451.1.5 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:

1. Ambient Temperature: Not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Construction Manager/Owner no fewer than fourteen (14) days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Construction Manager's/Owner's written permission.

T.451.1.6 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

T.451.1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Four (4) spares for each type of panelboard cabinet lock.

T.451.2 MATERIALS

T.451.2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:

a. Eaton Corporation; Cutler-Hammer Products;
b. General Electric Co.; Electrical Distribution & Protection Div.;
c. Siemens Energy & Automation, Inc.;
d. Square D; or
e. DRPA Approved Equal

T.451.2.2 MANUFACTURED UNITS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 16 Section "Electrical Supports and Seismic Restraints."

B. Enclosures: Surface-mounted cabinets.

1. Rated for environmental conditions at installed location.
   a. Outdoor Locations: NEMA 250, Type 4.
2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
5. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
6. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.

C. Phase and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
3. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.

D. Conductor Connectors: Suitable for use with conductor material.

1. Main and Neutral Lugs: Compression type.
2. Ground Lugs and Bus Configured Terminators: Compression type.
3. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.

E. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

T.451.2.3 PANELBOARD SHORT-CIRCUIT RATING

A. UL label indicating series-connected rating with integral or remote upstream overcurrent protective devices. Include size and type of upstream device allowable, branch devices allowable, and UL series-connected short-circuit rating.

B. Fully rated to interrupt symmetrical short-circuit current available at terminals.

T.451.2.4 DISTRIBUTION PANELBOARDS

A. Doors: Secured with vault-type latch with tumbler lock; keyed alike. Omit for fused-switch panelboards.

B. Main Overcurrent Protective Devices: Circuit breaker.

C. Branch Overcurrent Protective Devices:

1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.
3. Fused switches.

T.451.2.5 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

T.451.2.6 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: UL 489, with series-connected rating to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads.
3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
4. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
5. Provide motorized breakers with

T.451.2.7 ACCESSORY COMPONENTS AND FEATURES

A. Furnish accessory set including tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Fungus Proofing: Permanent fungicidal treatment for panelboard interior, including overcurrent protective devices and other components.

T.451.3.1 METHOD OF CONSTRUCTION

T.451.3.1.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Comply with mounting and anchoring requirements specified in Section T.427 "Electrical Supports and Seismic Restraints – Signal Gantries."

C. Mount top of trim 74 inches above finished floor, unless otherwise indicated.

D. Install overcurrent protective devices.

1. Set field-adjustable circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

T.451.3.1.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Electrical Identification."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

T.451.3.1.3 CONNECTIONS

A. Ground equipment according to Section T.453 "Grounding and Bonding – Signal Gantries".

B. Connect wiring according to Section T.428 - 432 "Conductors and Cables."

T.451.3.1.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Perform the following field tests and inspections and prepare test reports:

1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

T.451.3.1.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use

compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION T.452 DRY-TYPE TRANSFORMERS (600V AND LESS) – SIGNAL GANTRIES

T.452.1 GENERAL

T.452.1.1 SUMMARY

Section Includes:

A. Distribution transformers; and

B. Power Centers.

T.452.1.2 SUBMITTALS

A. Product Data Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Wiring and connection diagrams.

C. Manufacturer Seismic Qualification Certification: Submit certification that transformer assembly and components will withstand seismic forces defined in Division 16 Section "Electrical Supports and Seismic Restraints." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

D. Source quality-control test reports.

E. Output Settings Reports: Record of tap adjustments specified in Part 3.

T.452.1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with IEEE C 57.12.91.

C. Energy-Efficient Transformers Rated 15 kVA and Larger: Certified as meeting NEMA TP 1, Class 1 efficiency levels when tested according to NEMA TP 2.

T.452.1.4 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

T.452.1.5 COORDINATION

B. Coordinate installation of wall-mounting and structure-hanging supports.

T.452.2 PRODUCTS

T.452.2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acme Electric Corporation; Power Distribution Products Division.
2. Cutler-Hammer.
3. GE Electrical Distribution & Control.
4. Siemens Energy & Automation, Inc.
5. Square D/Groupe Schneider NA.
6. Or DRPA Approved Equal

T.452.2.2 MATERIALS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices, except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Copper.

T.452.2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Provide transformers that are internally braced to withstand seismic forces specified in Section T.427 "Electrical Supports and Seismic Restraints- Signal Gantries."

C. Cores: One leg per phase.

D. Enclosure: NEMA 250, Type 4.
   1. Finish Color: Gray

E. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature.

F. Taps for Transformers Smaller than 3 kVA: One 5 percent tap above normal full capacity.

G. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

H. Taps for Transformers 15 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

I. Fungus Proofing: Permanent fungicidal treatment for coil and core.

J. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels for transformer type and size indicated when factory tested in accordance with IEEE C57.12.91.

K. Mounting: Floor mounting on concrete pad.

T.452.2.4 POWER CENTER.

A. Distribution transformer: Comply with Section T.452.2.4.

B. Distribution Panelboard: Comply with Section T.451

T.452.2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

T.452.3 METHOD OF CONSTRUCTION

T.452.3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls and floors for suitable mounting conditions where transformers will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

T.452.3.2 INSTALLATION

A. Install transformers level on gantry structure. Installation to meet seismic requirements as required on gantry.

T.452.3.3 CONNECTIONS

A. Ground equipment according to Section T.453 "Grounding and Bonding – Signal Gantries".

B. Connect wiring according to Divisions T.428 thru T.432 "Conductors and Cables."

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

T.452.3.4 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 5 percent. Submit recording and tap settings as test results.

B. Output Settings Report: Prepare a written report recording output voltage and tap settings.

END OF SECTION

SECTION T.453 GROUNDING AND BONDING – SIGNAL GANTRIES

T.453.1 GENERAL

T.453.1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

T.453.1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.
   1. Underground distribution grounding.

T.453.1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Section T.453.3.4 "Field Quality Control" Article, including the following:
   1. Ground rods.
   2. Ground rings.
   3. Grounding arrangements and connections for separately derived systems.
   4. Grounding for sensitive electronic equipment.
C. Qualification Data: For testing agency and testing agency's field supervisor.
D. Field quality-control test reports.
E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
   1. Instructions for periodic testing and inspection of grounding features at test wells, ground rings, grounding connections for separately derived systems based on NETA MTS, NFPA 70B..
      a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
      b. Include recommended testing intervals.

T.453.1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

T.453.2 MATERIALS

T.453.2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:
   1. Solid Conductors: ASTM B 3.
   2. Stranded Conductors: ASTM B 8.
   3. Tinned Conductors: ASTM B 33.
   4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
   5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
   6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
   7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

T.453.2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
   1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

T.453.3 METHOD OF CONSTRUCTION

T.453.3.1 APPLICATIONS

A. Conductors: Install solid conductor indicated on the plans.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

T.453.3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.
B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
   1. Feeders and branch circuits.
   2. Single-phase motor and appliance branch circuits.
   3. Flexible raceway runs.
   4. Armored and metal-clad cable runs.

T.453.3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
   3. Use exothermic-welded connectors for outdoor locations.

T.453.3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Perform the following tests and inspections and prepare test reports:
   1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
   2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
      a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other

than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

b. Perform tests by fall-of-potential method according to IEEE 81.

C. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and less: 10 ohms.
2. Pad-Mounted Equipment: 5 ohms.

D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION T.454 BASIC ELECTRICAL MATERIALS AND METHODS – SIGNAL GANTRIES (INCIDENTAL)

T.454.1 GENERAL

T.454.1.1 SUMMARY

A. This Section includes the following:
   1. Electrical equipment coordination and installation.
   2. Sleeves for raceways and cables.
   3. Sleeve seals.
   4. Common electrical installation requirements.
   5. Supporting devices for electrical components.
   6. Electrical Identification.
   7. Cutting and patching for electrical construction.
   8. Touchup painting.

T.454.1.2 DEFINITIONS

A. ATS: Acceptance Testing Specifications.
B. EPDM: Ethylene-propylene-diene terpolymer rubber.
C. NBR: Acrylonitrile-butadiene rubber.

T.454.1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Dimensioned plans and sections or elevation layouts of electrical equipment.
C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

T.454.1.4 QUALITY ASSURANCE

A. Test Equipment Suitability and Calibration: Comply with NETA ATS, "Suitability of Test Equipment" and "Test Instrument Calibration."

T.454.1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:
   1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
   2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
   3. To allow right of way for piping and conduit installed at required slope.

4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

T.454.1.6 GENERAL REQUIREMENTS

A. Nothing contained in these "SPECIFICATIONS" or shown on the "DRAWINGS" shall be so constructed as to conflict with any local, municipal, or State laws or regulations governing the installation of electric or other work specified herein, and all such ordinances and regulations, including the National Electrical Code, are hereby incorporated and made a part of these specifications. All such requirements shall be satisfied by the Contractor and at no additional cost to the Authority.

B. Due to the small scale of drawings, it is not possible to indicate all conduits, conductors, boxes, fittings, switches, and similar parts which may be required. The contractor shall investigate the structural and finish conditions affecting the work and arrange all work accordingly furnishing such parts and equipment as may be required to meet the actual field conditions.

C. Contractor shall lay out work from dimensions of structural drawings and actual dimensions of equipment being installed. Layouts in congested areas should not be scaled from mechanical or electrical drawings.

D. The Drawings are indicative of the character and scope of the work and are not intended to show all the details.

E. The actual location of all wiring, outlets, and equipment shall be determined at the site.

F. The Drawings shall be carefully checked to insure that the equipment, as shown, will operate satisfactorily in the space allotted to it.

G. Generally, major equipment of the system is located on the electrical plans and the interconnecting conduit and wiring are indicated on the diagrams or called for in the Specifications.

T.454.1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

T.454.1.8 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in bridge structure during progress of construction to facilitate the electrical installations that follow.
   1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
C. Coordinate electrical service connections to components furnished by utility companies.
   1. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

T.454.1.9 REGULATIONS

A. All electrical work, equipment and material furnished or installed under this contract shall conform to the requirements of latest applicable codes and any other Governmental or Local Authorities having jurisdiction and all rules and regulations of the Utility Company involved. Nothing mentioned in the specifications or indicated on the drawings shall be construed to conflict with the mentioned codes, ordinances, and regulations.
B. All materials furnished and all work installed shall comply with the latest issue of the codes, rules, regulations, and recommendations of the following bodies, unless otherwise noted:
   1. American National Standards Institute (ANSI)
   2. American Society of Testing and Materials (ASTM)
   3. BOCA Basic Building Code.
   4. Insulated Power Cable Engineers Associate (IPCEA)
   5. Insulated Cable Engineers Associate (ICEA), formerly IPCEA.
   6. Illuminating Engineering Society (IES)
   7. Institute of Electrical and Electronic Engineers (IEEE)
   8. National Electrical Code (NEC)
   9. National Electrical Manufacturers Association (NEMA)
   10. National Fire Protection Association (NFPA)
   11. National Electrical Safety Code (NESC)
   12. National Electrical Contractor's Association (NECA)
   13. Occupational Safety and Health Agency (OSHA)
   14. Underwriters Laboratories, Inc. (UL)
   15. City or Local Code (s)
   16. Pennsylvania Department of Labor and Industry (L&I)
   17. Pennsylvania Department of Health (DoH)

18. National Board of Fire Underwriters
19. Americans with Disabilities Act (ADA)
20. Other codes as applicable.
21. City of Philadelphia Electrical Code

T.454.1.10 REFERENCES AND DEFINITIONS

A. Provide: Furnish and install.
B. Directed: Directed by the Engineer.
C. Indicated: Indicated in the Contract Documents.
D. Concealed: Hidden from normal sight. Includes items in shafts, pipe and duct spaces and above ceilings.
E. Exposed: Not concealed. Work within equipment rooms and all visible (normal sight) work shall be considered "exposed".

T.454.1.11 PERMITS AND INSPECTIONS

A. Give all necessary notices and obtain all required permits. Pay all fees and other costs, including utility connections or extensions in connection with the work. File all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental agencies having jurisdiction. Obtain all required certifications of inspection and deliver same to the Engineer.

T.454.1.12 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect, and handle all products to site. Inspect all products for damage.

T.454.1.13 RECORD DRAWINGS

A. The Contractor shall keep accurate records of all deviations in work as actually installed from work indicated. One complete set of Contract Documents shall be available at the construction site for indicating said deviations. The Contractor shall indicate routing of all feeders, cable tray, junction boxes and the like.

T.454.2 MATERIALS

T.454.2.1 MANUFACTURERS

A. In other articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

T.454.2.2 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

T.454.2.3 MATERIALS AND EQUIPMENT

A. All materials and equipment furnished for the project shall be new and of first quality, produced by manufacturers of recognized reputation for each line of material or equipment. The fact that materials or equipment offered are recently developed and untried may be sufficient justification for their rejection. All materials, fittings, devices, and equipment shall be those approved by the Underwriters Laboratories, Inc., and if of the class for which the Underwriters Laboratories, Inc. provides label service, they shall bear such labels.
B. Where there is more than one item of equipment furnished under this Contract, the Contractor shall furnish equipment of the same type and from the same manufacturer. In no case shall the Contractor furnish similar types of equipment from different manufacturers. One manufacturer shall furnish all similar types of equipment.

T.454.2.4 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

T.454.3 METHOD OF CONSTRUCTION

T.454.3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.
B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
E. Right of Way: Give to raceways and piping systems installed at a required slope.

F. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

T.454.3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
B. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
C. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
D. Cut sleeves to length for mounting flush with both surfaces of walls.
E. Extend sleeves installed in floors 2 inches above finished floor level.
F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require a different clearance.
G. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials.
J. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
L. Sleeves shall be provided by the Contractor for the installation of conduit, etc. the sleeves shall be carefully located in advance of the construction of walls and floors where new construction is involved. Provide all cutting and patching necessary to set sleeves which are not placed prior to construction. All cutting and patching necessary to set sleeves which are not placed prior to construction shall be the responsibility of the trade providing the sleeves.
M. Sleeves shall be provided for all conduit, etc. passing through concrete and masonry construction. Caulk the annular space of sleeves with an elastic fire resistant caulking compound to make installation fire, air and water tight.
N. Fasten sleeves securely in the construction so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into space between conduits, etc., and sleeve during construction.

O. Sleeves requiring in existing concrete or masonry walls shall be set and secured with mortar grout and fast drying bitumastic sealant.
P. At all sleeves where objectionable noise can be transmitted, at smoke barriers, at walls above ceilings that extend to underside of the structure of floor above, or at fire rated separations, seal all openings between conduit, etc. and corresponding sleeves to prevent sound transmission and to maintain fire rating. Use UL approved resilient sealant for penetration seals. Submit method of sealing for approval. Where watertight sleeves are indicated or required to suit the installation, provide Link Seal rubber seals, as manufactured by Thunderline Corporation or approved equal, between pipe and sleeves.
Q. Where conduit motion due to expansion and contraction will occur, provide sleeves of sufficient diameter, or permit free movement of conduit. Check construction to determine proper length for various locations; make actual lengths to suit the following:
    1. Terminate sleeves flush with walls, partitions, and ceilings.
    2. Terminate sleeves 2 inches above finished floor in equipment rooms, kitchen, and wet floor areas.
    3. In all other areas, terminate sleeves 1/2-inch above finished floors.

T.454.3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.
B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

T.454.3.4 FIRE STOPPING

A. Apply fire stopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Fire stopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

T.454.3.5 FIELD QUALITY CONTROL

A. Inspect installed sleeve and sleeve-seal installations and associated fire stopping for damage and faulty work.

T.454.3.6 WORKMANSHIP

A. Each subcontractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation of the work.

B. The quality of the workmanship required for each trade in the execution of its work shall be the finest and highest obtainable in that trade working with the materials specified. Workmanship shall be satisfactory to the Engineer and his decision as to the acceptable quality is final.

T.454.3.7 WATERPROOFING

A. Under no circumstances shall any waterproofing be damaged or penetrated. Should conditions arise which indicate such necessity, notify the Engineer. Penetrations required by this Contract shall be made watertight.

T.454.3.8 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

T.454.3.9 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:
   1. Raceways.
   2. Supporting devices for electrical components.
   3. Electricity-metering components.
   4. Concrete bases.
   5. Cutting and patching for electrical construction.
   6. Touchup painting.
B. Test Authority's electricity-metering installation for proper operation, accuracy, and usability of output data.
   1. Connect a load of known kW rating, 1.5 kW minimum, to a circuit supplied by the metered feeder.
   2. Turn off circuits supplied by the metered feeder and secure them in the "off" condition.
   3. Run the test load continuously for eight hours, minimum, or longer to obtain a measurable meter indication. Use a test load placement and setting that ensure continuous, safe operation.
   4. Check and record meter reading at end of test period and compare with actual electricity used based on test load rating, duration of test, and sample measurements of supply voltage at the test load connection. Record test results.

5. Repair or replace malfunctioning metering equipment or correct test setup; then retest. Repeat for each meter in installation until proper operation of entire system is verified.

T.454.3.10 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint.
   1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
   2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
   3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

T.454.3.11 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
C. Conduit and Equipment to be installed: Clean thoroughly to remove plaster, splattered paint, cement and dirt, on both exterior and interior.
D. Conduit and Equipment to be painted: Clean all conduit exposed to view in completed structure by removing plaster and dirt. Remove grease, oil, and similar material from conduit and equipment by wiping with clean rags and suitable solvents in preparation for paint.
E. All Items With Factory Finish: Remove cement, plaster, grease and oil, and leave all surfaces, including cracks and corners, clean and polish. Touch up any scratched or bare spots to match finish. The Engineer may approve factory finish as prime coat. See “Painting” Section.
F. All electrical apparatus and equipment in equipment rooms shall be provided with a factory finish coat.
G. Site Cleaning: Remove from site all packing cartons, scrap materials, and other rubbish relating to electrical installation.

END OF SECTION

SECTION T.455 VARIABLE SPEED LIMIT (VSL) SIGN – SIGNAL GANTRIES

T.455.1 GENERAL

T.455.1.1 DESCRIPTION OF WORK

A. Furnish (quantity per plans) Variable Speed Limit (VSL) signs and fully operational VSL sign systems to be installed on new structures on the Walt Whitman Bridge, as follows:
   1. Walt Whitman Bridge – (quantity per plans) front access signs
B. Electrical contractor to install VSL signs at each field site and provide mounts to gantries, conduit, and cables as necessary between the VSL sign controller, and the gantry control cabinet for operation of the VSL sign.
C. Tri-M Corporation will provide integration into the Supervisory Control and Data Acquisition (SCADA) system.

T.455.1.2 SUBMITTALS

A. Submit pre-build technical information, including product specifications and data sheets for each item used in the VSL sign and mounting attachments (LED to sign, and VSL sign to existing gantry).
B. Submit quality assurance documents and manufacturer qualifications and warranty as outlined in this document.
C. Submit an installation procedure and plans for the engineer's use showing all brackets, attachment details, and mounting hardware needed to install the VSL signs to the bridge gantry locations.
D. Submit one (1) complete VSL sign unit for review and approval by DRPA prior to the purchase of the remaining units. The sign to be submitted will be one of the total signs required for the project.
E. Submit an operational test plan for review and approval by the engineer and DRPA.

T.455.1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

T.455.2 MATERIALS

T.455.2.1 GENERAL

A. All materials furnished, assembled, fabricated or installed under this item will be new, corrosion resistant and in strict accordance with this specification.
B. The VSLs supplied shall be single self-contained units requiring connections to power and communications.

1. A VSL that has a separate controller will not be accepted.

C. The LED module manufacturer is to have a record of 5 years minimum experience manufacturing LED displays. The pre-build technical submittal must provide a resume of the company's previous experience in the public sector in the provision of LED displays.

D. The VSL sign system(s) provided for this contract must comply with the following specification and standards. If no revision date is specified, the most recent revision of the standard applies.

T.455.2.2 VARIABLE SPEED LIMIT (VSL) SIGN REQUIREMENTS

A. The VSL system will utilize the existing graphical user interface (GUI) from the existing supervisory control and data acquisition SCADA system located at the Police Central Communications (PCC) room at the Walt Whitman Bridge. The VSL sign will interface with the current Tri-M SCADA systems; the VSL signs will be connected to the SCADA system via dry contact closures.

B. The VSL unit shall include, but is not limited to:
   1. A 60" x 72" MUTCD R2-1 extruded aluminum static sign in accordance with the FHWA Manual of Uniform Traffic Control Devices (MUTCD Rev. 2009, Revisions 1 and 2);
   2. Full matrix and full color Light Emitting Diode (LED) module(s) capable of displaying 18-inch white digits (Amber will not be permitted) that approximate the E-series fonts for the following two (2) character messages: 20, 25, 35, and 45;
   3. VSL sign controller;
   4. Power and serial communications connections;
   5. A dry contact relay enclosure, to be supplied by others, that will interface between the VSL and the DRPAs SCADA system;
   6. Sun visor;
   7. Contrast shields;
   8. Internal wiring;
   9. Terminal strips for interconnecting wire, photosensor, fans, and surge protection as required by the sign manufacturer;
   10. Photosensor controls capable of communicating with the sign controller to monitor and control brightness level. An 'over-brightness' level of operation in fog or intense sunlight is required.

C. Sign mounting brackets shall be provided for mounting the VSL sign to the bridge gantry structures.

T.455.2.3 LED DISPLAY MODULE REQUIREMENTS

Each VSL sign is to include an LED display module with front access (with the ability to provide DRPA personnel access for maintenance without the need for a

lane closure) for all LED display electronics, environmental control equipment, air filters, wiring, and other internal components.

A. The LED module shall be housed in a NEMA 3 enclosure equipped with water drainage devices.
B. The LED module shall be able to display speed limits composed of any combination of one or two numeric digits. The LED characters shall be capable of flashing any combination of numerals. Characters shall be legible within a distance range of 150 feet to more than 1,000 feet from the module display face.
C. Optical and Electrical Characteristics
    1. LED and Pixel Characteristics – Provide high-quality LEDs providing diodes with a 30-degree viewing angle with a white color.
    2. The LED module shall consist of a full matrix format. Each pixel shall consist of a high-intensity LED cluster. The LED lamps shall run at a minimum voltage to provide extended life.
    3. Mount the LEDs directly to a printed circuit board at a maximum spacing of 35 millimeters that can be easily replaceable and individually removable using conventional electronics repair methods.
    4. Protect the LEDs from the outside environmental conditions, including moisture, snow, ice, wind, dust, dirt, and UV rays.
    5. Provide a built in light sensor for brightness control. The LED module controller shall continuously monitor the light sensors and adjust the LED display matrix intensity to a level that creates a legible message. Brightness control must be able to be returned to automatic from the module rear panel. Wireless control is not acceptable.
D. Power Requirements – The voltage to the LED modules and associated electronics must not exceed 12 VDC.
E. Electrical components and circuits must be designed, wired, and color-coded per the National Electric Code.
F. Environmental Behavior – Provide LEDs capable of operating without any decrease in performance over an ambient temperature range of -30 degrees F to 165 degrees F, with a relative humidity of up to 95%.
G. Product Electrical Safety – The LED module and all associated equipment and enclosures must be listed by the Underwriters Laboratories (UL) and must bear the UL mark on the outside of the enclosure. The module is to be listed as conformant to UL 48 Standard for Electric Signs and UL 50 Enclosures for Electrical Equipment.
H. Radio Frequency Emissions – All equipment must be designed in accordance with Federal Communications Commission (FCC) Part 15, Subpart B as a “Class A” digital device.
I. The LEDs shall be rate by the LED manufacturer to have a minimum lifetime of 100,000 hours of continuous operation while maintaining a minimum of 70% of the original brightness.
J. LED modules are to present a clean and neat appearance as specified in the general requirements. Poor workmanship will be cause for rejection of the

sign. Have a complete sign housing of the LED module designed and manufactured in-house by the LED module manufacturer.

K. Provide LED modules with no degradation of performance including visibility or legibility of the display due to continuous vibration caused by wind, traffic or other factors.
L. Provide LED modules with no degradation of performance due to the presence of power transients or electromagnetic fields, including those created by any components of the system. Provide LED modules that do not conduct or radiate signals that adversely affect other electrical or electronic equipment including, but not limited to, other control systems, data processing equipment, audio, and radio and industrial equipment.
M. All electronic components, except printed circuit boards, must be commercially available, easily accessible, replaceable and individually removable using conventional electronics repair methods.
N. Provide all electronic assemblies that meet or exceed IPC 610A workmanship standards.

T.455.2.4 VSL SIGN CONTROLLER REQUIREMENTS

A. A VSL sign controller is to be provided at each VSL location to allow for remote control of the sign LED module display.
B. The controller shall be capable of receiving commands from a Master Computer (MC) and the local panel, and using those commands to control the sign.
C. The controller is to be individually addressable by the Master Computer (MC) via the communications system for the control monitoring.
D. The controller shall be capable of monitoring its own electronics status (Printed Circuit Boards (PCB) and modules) and report any status changes, including, but not limited to the status of LEDs on the sign.
E. The controller shall be capable of controlling brightness level by photosensor controls located in the VSL sign.
F. The controller shall be capable of displaying a single static message or flashing message. The “message” refers to actual speed (numerical value) being displayed.
G. The controller shall be capable of blanking the sign, or placing the sign in neutral condition following termination of a displayed message.
H. Under communications or power failure, the controller shall contain a fail-safe mechanism to automatically blank the sign or post a default message that is selectable.
I. Environmental Behavior – Provide a controller capable of operating without any decrease in performance over an ambient temperature range of -30 degrees F to 165 degrees F, with a relative humidity of up to 95%.
J. The VSL sign controller is to be incorporated within the VSL sign housing.
K. Provide lightning protection and termination for all communication cables.
L. Electrical contractor to provide power for the sign controller by a power strip in the gantry control cabinet.

M. Label all provided cabling individually and clearly with permanent markings.

T.455.2.5 COMMUNICATIONS REQUIREMENTS

A. The communication protocol shall follow the NTCIP standards as specified in NEMA standard TS 3.6 or its latest version.
B. Data transmission rate shall be configurable to select from 1200, 2400, 4800, or 9600 bps and set to the rate of 9600 bps.
C. Exchanges between the VSL sign controller and Master Computer (MC) are to be made only upon a Master Computer request inviting the VSL sign controller to send (select) or receive (poll) data.

T.455.2.6 CONTROL SOFTWARE REQUIREMENTS

A. Provide any control software from the VSL sign manufacturer to support VSL sign control, monitoring, maintenance, and diagnostics functions from the DRPA's SCADA system located at both the Walt Whitman Bridge PCC and the back-up Benjamin Franklin Bridge PCC and locally at the sign site location.
B. Control software provided is to be configured for the devices included in this contract.

T.455.3 METHOD OF CONSTRUCTION

T.455.3.1 GENERAL

A. The VSL sign manufacturer shall provide on-site technical installation expertise on the project or until DRPA and the technical expert agree that the installation procedure has been mastered by DRPA. DRPA shall install the modules as directed by the manufacturer, tilting the units, as needed, toward the roadway per manufacturer's recommendations, to achieve maximum visibility from the roadway.
B. Low Voltage (power) and extra low voltage (control) cables shall be installed as necessary by the electrical contractor to operate the VSL sign. The cables shall be installed in continuous, un-spliced lengths between the sign case and the controller unit, and power supply. Sufficient slack shall be provided to ensure that the connections to the controller and the power source will be possible without the need to add or splice any cables.
C. The electrical contractor shall be responsible for the "as-built" drawings and/or diagrams showing in detail the final configurations at each field location and the Police Central Communications (PCC).

T.455.3.2 TESTING

A. Identify and develop a test procedure based upon the specifications below that will verify operational compliance to these specifications and submit it to the

engineer and DRPA for review and approval. Approval of the test plan must occur a minimum of 5 business days before testing.

B. Upon approval of test procedures, the DRPA will perform the test, under the witness of the supplier, to establish conformance with the latest applicable standards through unit testing, integrations testing, and system testing following installation. Ensure system hardware interchangeability with the existing control software.
   1. Unit Bench Testing – conduct factory demonstration tests at the manufacturer's facility prior to shipping the equipment, to verify that each system meets the contractual requirements. Where a standard off-the-shelf product is supplied for this project, unit bench testing will be waived by the DRPA for the product as long as the supplier provides a factory test affidavit from the manufacturer.
   2. Integration Testing (On-Site) – conduct on-site stand-alone testing prior to installation on the gantry structures to verify that each LED module satisfies the functional requirements of this contract. Conduct these tests prior to interconnection to the PCC at the Walt Whitman Bridge and backup PCC at the Benjamin Franklin Bridge.
   3. Final System Acceptance Testing – conduct final system acceptance testing from the PCC at the Walt Whitman Bridge and backup PCC at the Benjamin Franklin Bridge to verify that the overall system meets the requirements of this contract.
      a. Conduct testing in the order indicated. Do not begin a later stage of testing until earlier stage(s) of testing have been successfully completed and approved by the engineer and DRPA.
      b. Fully test all functions of the new VSL sign equipment through the existing traffic control equipment software. Utilize the VSL control software to fully test all functions for the LED display modules.
      c. Fully exercise all functions of the VSL and control equipment system for each field location. Demonstrate that the communications system is fully functional, including network management, malfunction isolation/diagnosis of failed equipment, and performance monitoring, as applicable.
      d. In the event of a test failure, perform a partial or total re-test to demonstrate that the system is functioning as a whole.
   4. 30-Day Observation Period – A 30-day observation period will follow the System Acceptance Test, during which system failures will be categorized as Catastrophic (rendering all the VSL signs totally unusable), Major (render most (60%) of the VSL signs unusable), Minor (rendering a few (less than 10%) of the VSL signs unusable). If a Catastrophic Failure occurs, the 30-Day count will stop. If multiple Catastrophic Failures occur, DRPA reserves the right to restart the 30-Day observational period to day 1. If a Major Failure occurs, the 30-Day count will stop. If multiple (2 or more) Major Failures occur, DRPA reserves the right to restart the 30-Day observational period to day 1. If a Minor Failure occurs, the 30-Day count will stop only if the solution takes greater than 1 day to resolve, otherwise

the day count will not stop. If multiple (greater than 3) Minor Failures occur in any one subsystem on a given day, the supplier will add one additional day to the 30-Day observational period for each occurrence.

T.455.3.3 INSPECTION

A. After testing documentation is approved, provide all parties involved at least ten (10) working days' notice prior to all test to permit the DRPA to perform on-site and system acceptance tests.
B. In the event that 25% or more of the VSL signs malfunction during any test period, the DRPA may declare the VSL signs defective and require replacement of all similar equipment at no additional cost. Document its successful completion.
C. The VSL sign manufacturer must provide unit test documentation indicating that the VSL sign product has been tested to the standards identified in this document. Failure to conform to these testing requirements will be grounds for rejection. Rejected equipment may be offered for test or retest provided all non-compliant items have been corrected and tested or retested by the VSL sign manufacturer. Any corrections deemed necessary by the DRPA must be made by the VSL sign manufacturer, at no additional cost to the owner.

T.455.3.4 MANUFACTURER WARRANTY

A. The Manufacturer shall warrant that all materials and equipment furnished under this Contract shall be new unless otherwise specified and approved, and that all work shall be of good quality, free from faults and defects and in conformance with the Contract Documents.
B. All work not conforming to these standards may be considered defective.
C. The Manufacturer shall guarantee the work against defective materials and workmanship for a period of at least one (1) year from the date of completion and final acceptance by the DRPA.
D. The date of final acceptance of the work shall be the successful completion of the complete system diagnostics/final inspection.
E. If, during final inspection, any work is found to be unsatisfactory or incomplete in a minor respect, the DRPA shall issue the necessary instructions regarding correction of the work such that final acceptance by the DRPA may be obtained. The Contractor shall promptly comply with and execute such instructions. The date of final acceptance as to any satisfactory portion of the work shall be the date of its inspection and approval; and the date of final acceptance as to any unsatisfactory or incomplete work shall be that date when the work is corrected by the Contractor to the DRPA's satisfaction and final acceptance, and the Contractor notified to that effect in writing.
F. If, during final inspection by the engineer and DRPA, any work is found to be substantially unsatisfactory or incomplete in the opinion of the engineer and DRPA, a second inspection shall be made following correction, and the one

(1) year guarantee shall run from the date that corrections are made and accepted by the DRPA and the Contractor so notified by the DRPA in wiring.

G. If, within the warranty period, any work shall prove to be defective, either in workmanship of materials, the Contractor shall, upon demand of the DRPA (whose decision as to such defectiveness shall be binding and conclusive upon the parties hereto), repair such defective work and replace any consequential damage to other parts or structures, at the Contractor's own cost and expense, without cost or expense to the DRPA, and to the approval and satisfaction of the DRPA. If the Contractor refuses or neglects to commence such corrective work within five (5) calendar days from the date of such demand, or if the Contractor fails to complete such corrective work within the time prescribed, then the DRPA shall be entitled to have the corrective work done by others, and the costs shall be borne by the Contractor or his surety.

T.455.3.5 SPARE PARTS

A. As part of the Bid, the bidder shall include the following spare parts:
   1. 10 (ten) replacement LED module boards.

END OF SECTION

SECTION T.456 NETWORK SWITCH – SIGNAL GANTRIES

T.456.1 GENERAL

T.456.1.1 SUMMARY

Section Includes:
a. Fiber Network Switch.

T.456.1.2 DEFINITIONS

BICSI: Building Industry Consulting Service International.
EMI: Electromagnetic interference.
IDC: Insulation displacement connector.
LAN: Local area network.
RCDD: Registered Communications Distribution Designer.

T.456.1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

T.456.2 MATERIALS

T.456.2.1 NETWORK SWITCH

A. Description: Cisco IE-3010-16S-8PC;
   1. Rack mountable fiber switch with 16 fast ethernet SFP ports, (8) 10/100BaseTX/PoE ports
B. Provide with power supply as required; or
C. DRPA Approved Equal.

END OF SECTION

SECTION T.457 SITE COORDINATION AND CONDITIONS

T.457.1 GENERAL

T.457.1.1 DESCRIPTION

This is an allowance item which covers contingent Work required for contract completion to address "Differing Site Conditions" as defined in Section E.4.15 of the General Provisions or additional Work as desired by the Chief Engineer.

T.457.2 SUBMITTALS

The Contractor shall submit a written request to utilize funds from this item, with sufficient supporting documentation acceptable to the Engineer to demonstrate that this Work differs materially from those ordinarily encountered and generally recognized as involved in the Work provided for in the Contract. The Contractor's request to utilize funds under this item must be reviewed and approved in writing by the Chief Engineer. Work progressed under this item without such prior approval is done at the Contractor's risk.

END OF SECTION

SECTION T.458 INCENTIVE FOR EARLY COMPLETION, STAGES 1 THROUGH 2

T.458.1 GENERAL

T.458.1.1 DESCRIPTION OF WORK

A. Early completion of Stages 1 through 2 is defined as the number of days that the construction staging (Stages 1 through 2) is finished prior to the pre-determined **two hundred seventy (270)** consecutive calendar days that is allotted for this work.
B. The Authority will compensate the Contractor **$25,000** per day as an incentive for early completion of Stages 1 through 2 works. The total dollar incentive amount for early completion is capped at **$4,000,000.** The duration starts with the installation of maintenance and protection of traffic (MPT) devices required for Stage 1 and concludes with the removal of all MPT devices used for Stage 2 and the corridor operating with two (2) lanes of traffic in each direction within the limits of the Stage 1 and Stage 2 works.

T.458.1.2 RELATED SECTIONS

A. Special Provision SP.5 – Time of Starting and Completing Work and Liquidated Damages.

END OF SECTION

SECTION T.459-480 NOT USED

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SECTION Q. QUANTITIES AND PAYMENT

GENERAL: It is the purpose and intent of the Contract Drawings and Specifications to rehabilitate approximately a 2.6 mile section of the Pennsylvania approach to the Walt Whitman Bridge in Philadelphia, Pennsylvania, including ten bridge decks and sixteen ramps.

The payment for this work will be made only as stated in the Contract and described under the Items of Work as set forth in the Schedule of Quantities, Price and Total of Bid. The lump sum and unit prices bid for the various items of work shall include all plant, equipment, staging, transportation, testing, labor, power, materials, a proper proportion of the Contractor's overhead and profit, and in general, the meeting of any and all expenses and obligations of the Contractor necessary to complete the work in all respects in accordance with the full intent and meaning of the Contract, the Drawings, and the Specifications.

ITEM 1 MOBILIZATION AND CLEAN UP

The work specified in Section T.1 for Mobilization and Cleanup is a lump sum item as set forth in the schedule and will be measured as a unit of work acceptably performed.

The Contract lump sum price bid for Mobilization and Cleanup is limited to an amount up to a maximum of seven percent (7%) of the "Total Amount of Bid.

The Contract lump sum price bid for Mobilization and Cleanup will be payable to the Contractor in accordance with the following schedule:

(a) Whenever the Contractor has performed work equal to 10% of the “Total Amount Bid”, 40% of the amount bid for Mobilization and Clean Up will be paid.

(b) Whenever the Contractor has performed work equal to 50% of the “Total Amount Bid”, 30% of the amount bid for Mobilization and Clean Up will be paid.

(c) The remaining 30% of the amount bid for Mobilization and Clean Up will be paid at the completion of the Project.

ITEM 2 ENGINEER’S FIELD OFFICE

The work specified in Section T.2 for Engineer's Field Office is a lump sum item as set forth in the schedule and will be measured as a unit, acceptably complete as specified. The price per lump sum shall include the placement, daily maintenance and removal at the completion of the project.

The Contract lump sum price bid for Engineer’s Field Office will be payable to the Contractor in accordance with the following schedule:

(a) Whenever the Contractor has provided the required furnishings and equipment in the field office, suitable for occupation by the Engineer, the amount bid for "Engineer's Field Office" will be paid in equal monthly payments based on the anticipated contract term. Total payment for this item, however, shall not exceed the contract lump sum price bid irrespective of the actual duration of the contract.

ITEM 3 FIELD SURVEY AND ENGINEERING

The work specified in Section T.3 for Field Surveying and Engineering will be measured as a unit, acceptably completed as specified. The lump sum price shall include all field dimensional checks and surveys, and shop drawing submissions.

Payment for Field Surveying and Engineering will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 4 COORDINATION OF ELECTRICAL UTILITIES

The work specified in Section T.4 is a lump sum for Coordination of Electrical Utilities. This item includes all labor, equipment and materials necessary to coordinate the relocation of any unforeseen utilities in conflict with the proposed improvements.

The Contract lump sum price bid for this item shall be payable to the Contractor in monthly payments, based on the percentage of work complete.

ITEM 5 CLEARING AND GRUBBING

The work specified in Section T.5 for Clearing and Grubbing will be measured as a unit, acceptably completed as specified. The price per lump sum shall include the removal and storage of topsoil and the removal and disposal of organic and vegetative material, rubbish and debris.

Payment for Clearing and Grubbing will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 6 MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION

The work specified in Section T.6 for Maintenance and Protection of Traffic During Construction will be measured by the unit lump sum, acceptably completed as specified. The lump sum price shall include the furnishing, storing, installing, maintaining, moving, and relocating all temporary traffic control devices unless otherwise indicated in the contract drawings; controlling, warning, guiding, and protecting vehicular and pedestrian traffic affected

by construction of the Project; restricting general public and construction vehicular traffic to approved routes; and prohibiting stopping and parking of vehicles adjacent to the Work site. This item includes the removal of temporary traffic control devices.

This item includes the submission of Maintenance and Protection of Traffic Plans for the approval of the DRPA, Pennsylvania Department of Transportation, and the City of Philadelphia for all operations affecting traffic.

Maintenance and Protection of Traffic during construction will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer. Partial payments shall be made on a pro-rata basis and in accordance with the Contract. A monthly rate for determining amount of these partial payments will be calculated by dividing the lump sum price bid for this item by the number of months between the Notice-to-Proceed and the specified completion date (specified in Special Provision SP.5). No additional monthly payments will be made to the Contractor for construction duration that extends beyond the specified time for total contract duration. If all Work is completed prior to the specified time for total contract duration, Contractor will be paid remaining balance of the amount bid for Item 6.

Separate payment will not be made for Traffic Control Coordinator but all costs thereof shall be incidental to Maintenance and Protection of Traffic.

Any detours used exclusively for hauling materials and equipment for the convenience of the Contractor shall be constructed and maintained at no cost to the Authority.

The engineering for preparing the Traffic Control Plans shall be incidental to this item.

All Maintenance and Protection of Traffic costs shall be included as part of Item 6 unless the costs are otherwise specifically indicated as part of other items.

ITEM 7 TOW TRUCKS

The work specified in Section T.7 for Tow Trucks will be measured as a unit, acceptably completed as specified. The price per lump sum shall include the furnishing of vehicles, operators and removal of vehicles.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Payment for Tow Trucks will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer in equal monthly payments for the months during which this service is provided, which is based upon the proposed construction period.

ITEM 8 TEMPORARY INLET GRATE

The work specified in Section T.8 Temporary Inlet Grate will be measured by the unit each (each inlet grate), acceptably completed. The price each shall include access, and all labor, material and equipment necessary to install and remove the grates.

Payment for Temporary Inlet Grate will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 9 NOT USED

ITEM 10 MILLING OF BITUMINOUS PAVEMENT SURFACE, 2" DEPTH, MILLED MATERIAL RETAINED BY CONTRACTOR

The work specified in Section T.10 for Milling of Bituminous Pavement Surface will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include removal, transporting and disposal.

Payment for Milling of Bituminous Pavement Surface will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 11 NOT USED

ITEM 12 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, 2" DEPTH, SRL-E

The work specified in Section T.12 for HMA Wearing Course will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include submission of material-mix design, materials, placement, compaction, field and laboratory testing and quality control.

Payment for HMA Wearing Course will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 13 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, 2" DEPTH, SRL-E

The work specified in Section T.13 for HMA Wearing Course will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include submission of material-mix design, materials, placement, compaction, field and laboratory testing and quality control.

Payment for HMA Wearing Course will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 14 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE (LEVELING), PG 76-22, 10 TO < 30 MILLION ESALS, 12.5 MM MIX, SRL-E

The work specified in Section T.14 for HMA Wearing Course (Leveling) will be measured using the weight method acceptably completed as specified. The price per ton shall include submission of material-mix design, materials, placement, compaction, field and laboratory testing and quality control.

Payment for HMA Wearing Course (Leveling) will be paid for at the contract unit price bid per ton, acceptably constructed as specified and as accepted by the Engineer.

ITEM 15 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 25.0 MM MIX, 3" DEPTH

The work specified in Section T.15 for HMA Binder Course will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include submission of material-mix design, materials, placement, compaction, field and laboratory testing and quality control.

Payment for HMA Binder Course will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 16 SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE, PG 64-22, 10 TO < 30 MILLION ESALS, 37.5 MM MIX, 8" DEPTH

The work specified in Section T.16 for HMA Base Course will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include submission of material-mix design, materials, placement, compaction, field and laboratory testing and quality control.

Payment for HMA Base Course will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 17 SUBBASE 6" DEPTH (NO. 2A)

The work specified in Section T.17 for Subbase 6" Depth (No. 2A) will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include furnishing, transporting, subgrade preparation, installing, compacting, density and

laboratory testing. The price per square yard shall also include bituminous prime coat, where required.

Payment for Subbase 6" Depth (No. 2A) will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 18 SUBBASE 11" DEPTH (NO. 2A)

The work specified in Section T.18 for Subbase 11" Depth (No. 2A) will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include furnishing, transporting, subgrade preparation, installing, compacting, density and laboratory testing. The price per square yard shall also include bituminous prime coat, where required.

Payment for Subbase 11" Depth (No. 2A) will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 19 BITUMINOUS TACK COAT

The work specified in Section T.19 for Bituminous Tack Coat will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include submission of material-mix design, materials, placement, field and laboratory testing and quality control.

Payment for Bituminous Tack Coat will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 20 CEMENT CONCRETE SIDEWALK, 4" DEPTH

The work specified in Section T.20 for Cement Concrete Sidewalk will be measured using the two-dimensional method, acceptably completed as specified. The price per square yard shall include submission of material-mix design, materials, placement, field and laboratory testing and quality control.

Payment for Cement Concrete Sidewalk will be paid for at the contract unit price bid per square yard, acceptably constructed as specified and as accepted by the Engineer.

ITEM 21 BITUMINOUS SHOULDER RUMBLE STRIPS

The work specified in Section T.21 for Bituminous Shoulder Rumble Strips will be measured by the linear foot of actual milled rumble strip placed on the shoulder pavement.

Payment for Bituminous Shoulder Rumble Strips will be made at the contract unit price bid per linear foot of shoulder rumble strip acceptably milled as specified.

ITEM 22 NO. 57 COARSE AGGREGATE

The work specified in Section T.22 for No. 57 Coarse Aggregate will be measured using the three-dimensional method, acceptably completed as specified. The price per cubic yard shall include field dimensional check, materials, placement, backfill and compaction, testing and quality control.

Payment for No. 57 Coarse Aggregate will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 23 DUST CONTROL PERMIT

This is a predetermined allowance item which covers costs incurred for obtaining a dust control permit through Philadelphia Air Management Services. Reimbursement is based upon submission of receipts obtained during the permitting process.

Payment for Dust Control Permit item will be for permit related items only and any money remaining in this item at the end of the project will be credited to the Authority. Payment will be based on actual costs incurred by the Contractor on a force account or other agreed to price.

ITEM 24 CLASS 1 EXCAVATION

The work specified in Section T.24 for Class 1 Excavation will be measured using the three-dimensional method, acceptably completed as specified. The price per cubic yard shall include the excavation, transportation, placement, storage and/or disposal.

Payment for Class 1 Excavation will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 25 CLASS 1B EXCAVATION

The work specified in Section T.25 for Class 1B Excavation will be measured using the three-dimensional method, acceptably completed as specified. The price per cubic yard shall include the sawcut, excavation, transportation, placement, storage and/or disposal.

Payment for Class 1B Excavation will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 26 CLASS 2 EXCAVATION

The work specified in Section T.26 for Class 2 Excavation will be measured using the three-dimensional method, acceptably completed as specified. The price per cubic yard shall include the excavation, transportation, placement, storage and/or disposal.

Payment for Class 2 Excavation will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 27 CLASS 4 EXCAVATION

The work specified in Section T.27 for Class 4 Excavation will be measured using the three-dimensional method, acceptably completed as specified. The price per cubic yard shall include the excavation, transportation, placement, storage and/or disposal.

Payment for Class 4 Excavation will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 28 TOPSOIL, FURNISHED AND PLACED

The work specified in Section T.28 for Topsoil, Furnished and Placed will be measured using the three-dimensional method, acceptably completed as specified. The price per cubic yard shall include furnishing, transporting and placement.

Payment for Topsoil, Furnished and Placed will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 29 FOREIGN BORROW EXCAVATION

The work specified in Section T.29 for Foreign Borrow Excavation will be measured using the three-dimensional method, acceptably completed as specified.

Payment for Foreign Borrow Excavation will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 30 COMMON BORROW EXCAVATION

The work specified in Section T.30 for Common Borrow Excavation will be measured using the three-dimensional method, acceptably completed as specified.

Payment for Common Borrow Excavation will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 31 SOIL AMENDMENT

The work specified in Section T.31 for Soil Amendment will be measured as the final mixed product in its final position, using the three-dimensional method, acceptably completed as specified.

Payment for Soil Amendment will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer. Payment includes all labor, materials, and equipment required to provide the final mixed product (Amended Soil) in place as specified.

ITEM 32 NOT USED
ITEM 33 NOT USED
ITEM 34 NOT USED
ITEM 35 NOT USED
ITEM 36 NOT USED
ITEM 37 NOT USED
ITEM 38 NOT USED

ITEM 39 PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB - 4" CONCRETE CURB

The work specified in Section T.39 for Plain Cement Concrete Curb will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, subbase, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Plain Cement Concrete Curb will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 40 PLAIN CEMENT CONCRETE CURB, INCLUDING REMOVAL OF EXISTING CURB - 8" CONCRETE CURB

The work specified in Section T.40 for Plain Cement Concrete Curb will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, subbase, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Plain Cement Concrete Curb will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 41 CURB TRANSITION FROM 4" CONCRETE CURB TO 8" CONCRETE CURB

The work specified in Section T.41 for Curb Transition will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, subbase, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Curb Transition will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 42 CURB END TERMINAL

The work specified in Section T.42 for Curb End Terminal will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, subbase, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Curb End Terminal will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 43 DEPRESSED CURB

The work specified in Section T.43 for Depressed Curb will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, subbase, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Depressed Curb will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 44 NOT USED
ITEM 45 NOT USED
ITEM 46 NOT USED
ITEM 47 NOT USED
ITEM 48 NOT USED
ITEM 49 NOT USED
ITEM 50 NOT USED
ITEM 51 NOT USED

ITEM 52 50" CONCRETE GLARE SCREEN

The work specified in Section T.52 for 50” Concrete Glare Screen will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for 50” Concrete Glare Screen will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 53 50" ASYMMETRICAL CONCRETE GLARE SCREEN

The work specified in Section T.53 for 50” Asymmetrical Concrete Glare Screen will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for 50” Asymmetrical Concrete Glare Screen will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 54 TRANSITION FROM EXISTING CONCRETE GLARE SCREEN TO 50" CONCRETE GLARE SCREEN

The work specified in Section T.54 for Transition From Existing Concrete Glare Screen To 50” Concrete Glare Screen will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Transition From Existing Concrete Glare Screen To 50” Concrete Glare Screen will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 55 NOT USED

ITEM 56 TRANSITION FROM 50" CONCRETE GLARE SCREEN TO ASYMMETRICAL CONCRETE GLARE SCREEN

The work specified in Section T.56 for Transition From 50” Concrete Glare Screen To Asymmetrical Concrete Glare Screen will be measured using the unit each, acceptably

completed as specified. The price per each shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Transition From 50" Concrete Glare Screen To Asymmetrical Concrete Glare Screen will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 57 TRANSITION FROM 50" CONCRETE GLARE SCREEN TO CONCRETE MEDIAN BARRIER

The work specified in Section T.57 for Transition From 50" Concrete Glare Screen To Concrete Median Barrier will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Transition From 50" Concrete Glare Screen To Concrete Median Barrier will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 58 TRANSITION FROM EXISTING CONCRETE GLARE SCREEN TO ASYMMETRICAL CONCRETE GLARE SCREEN

The work specified in Section T.58 for Transition From Existing Concrete Glare Screen To Asymmetrical Concrete Glare Screen will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Transition From Existing Concrete Glare Screen To Asymmetrical Concrete Glare Screen will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 59 TRANSITION FROM ASYMMETRICAL CONCRETE GLARE SCREEN TO DUAL SINGLE FACED BARRIER

The work specified in Section T.59 for Transition From Asymmetrical Concrete Glare Screen To Dual Single Faced Barrier will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Transition From Asymmetrical Concrete Glare Screen To Dual Single Faced Barrier will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 60 CONCRETE MEDIAN BARRIER

The work specified in Section T.60 for Concrete Median Barrier will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Concrete Median Barrier will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 61 END TRANSITION, CONCRETE MEDIAN BARRIER

The work specified in Section T.61 for End Transition, Concrete Median Barrier will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, field survey, removal and disposal of existing median barrier, forming, concrete, delineators, pre-molded expansion filler and seal, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for End Transition, Concrete Median Barrier will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 62 SINGLE FACE CONCRETE BARRIER

The work specified in Section T.62 for Single Face Concrete Barrier will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, weepholes, fabric filter drain, concrete cap, welded wire fabric, bond breaker, coarse aggregate, delineators, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Single Face Concrete Barrier will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 63 END TRANSITION, SINGLE FACE CONCRETE BARRIER

The work specified in Section T.63 for End Transition, Single Face Concrete Barrier will be measured using the unit each, acceptably completed as specified. The price per each shall

include shop drawings, forming, concrete, pre-molded expansion filler and seal, fabric filter drain, delineators, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for End Transition, Single Face Concrete Barrier will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 64 MODIFIED RETAINED FILL BARRIER

The work specified in Section T.64 for Modified Retained Fill Barrier will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, weepholes, fabric filter drain, delineators, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Modified Retained Fill Barrier will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 65 PADDLE GLARE SCREEN

The work specified in Section T.65 for Paddle Glare Screen will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, paddles, base strip, adhesives, delineators, and all other miscellaneous hardware required for a complete installation.

Payment for Paddle Glare Screen will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 66 MODIFIED RETAINED FILL BARRIER TRANSITION

The work specified in Section T.66 for Modified Retained Fill Barrier Transition will be measured using the unit each, acceptably completed as specified. The price per each shall include shop drawings, forming, concrete, pre-molded expansion filler and seal, fabric filter drain, weepholes, delineators, finishing, curing, concrete testing for air, slump and compressive strength.

Payment for Modified Retained Fill Barrier Transition will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 67 NOT USED
ITEM 68 NOT USED
ITEM 69 NOT USED
ITEM 70 NOT USED
ITEM 71 NOT USED
ITEM 72 NOT USED
ITEM 73 NOT USED
ITEM 74 NOT USED

ITEM 75 RIGHT-OF-WAY FENCE, TYPE 1

The work specified in Section T.75 for Right-of-Way Fence, Type 1 will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include removal and disposal of existing fence to be replaced, fence, posts, fasteners, cable, concrete and all other incidental items required for a complete installation. The price per linear foot shall also include temporary removal and replacement of existing fence sections and poles, as indicated.

Payment for Right-of-Way Fence, Type 1 will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 76 VEHICULAR GATE FOR TYPE 1 RIGHT-OF-WAY FENCE

The work specified in Section T.76 for Vehicular Gate For Type 1 Right-Of-Way Fence will be measured using the unit each, acceptably completed as specified. The price per each shall include gate and other incidental items for a complete installation.

Payment for Vehicular Gate For Type 1 Right-Of-Way Fence will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 77 NOT USED
ITEM 78 NOT USED
ITEM 79 NOT USED
ITEM 80 NOT USED
ITEM 81 NOT USED
ITEM 82 NOT USED
ITEM 83 NOT USED
ITEM 84 NOT USED
ITEM 85 NOT USED
ITEM 86 NOT USED
ITEM 87 NOT USED
ITEM 88 NOT USED
ITEM 89 NOT USED
ITEM 90 NOT USED
ITEM 91 NOT USED

ITEM 92 TYPE 31-S GUIDE RAIL

The work specified in Section T.92 for Type 31-S Guide Rail will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include furnishing, post, rail, offset brackets, delineators, hardware and installation.

Payment for Type 31-S Guide Rail will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 93 TYPE 31-SC GUIDE RAIL

The work specified in Section T.93 for Type 31-SC Guide Rail will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include furnishing, post, rail, offset brackets, delineators, hardware and installation.

Payment for Type 31-SC Guide Rail will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 94 TYPE 31-SCC GUIDE RAIL

The work specified in Section T.94 for Type 31-SCC Guide Rail will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include furnishing, post, rail, offset brackets, delineators, hardware and installation.

Payment for Type 31-SCC Guide Rail will be paid for at the contract unit price bid per linear foot, acceptably constructed as specified and as accepted by the Engineer.

ITEM 95 REMOVAL OF EXISTING GUIDE RAIL (CONTRACTOR'S PROPERTY)

The work specified in Section T.95 for Removal Of Existing Guide Rail will be measured using the linear method, acceptably removed as specified. The price per linear foot shall include removal of post, rails, hardware, backfilling, delivery of aluminum rails to the DRPA Maintenance Yard and disposal.

Payment for Removal Of Existing Guide Rail will be paid for at the contract unit price bid per linear foot, acceptably removed as specified and as accepted by the Engineer.

ITEM 96 NOT USED
ITEM 97 NOT USED

ITEM 98 TYPE 31 STRONG POST ANCHOR TERMINAL

The work specified in Section T.98 for Type 31 Strong Post Anchor Terminal will be measured by the unit each, acceptably installed as specified. The price per each shall include the furnishing, installation, delineators, hardware and base preparation.

Payment for the Type 31 Strong Post Anchor Terminal will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 99 TERMINAL SECTION, SINGLE

The work specified in Section T.99 for Terminal Section, Single will be measured by the unit each, acceptably completed. The price per each shall include furnishing, materials, post, delineators, hardware and installation.

Payment for Terminal Section, Single will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 100 TERMINAL SECTION, BRIDGE CONNECTION

The work specified in Section T.100 for Terminal Section, Bridge Connection will be measured by the unit each, acceptably completed. The price per each shall include furnishing, materials, hardware and installation.

Payment for Terminal Section, Bridge Connection will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 101 TYPICAL AND ALTERNATE CONCRETE BRIDGE BARRIER TRANSITION WITHOUT INLET PLACEMENT

The work specified in Section T.101 for Typical And Alternate Concrete Bridge Barrier Transition Without Inlet Placement will be measured by the unit each, acceptably completed. The price per each shall include furnishing, post, rail, offset brackets, delineators, hardware and installation.

Payment for Typical And Alternate Concrete Bridge Barrier Transition Without Inlet Placement will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 102 THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION

The work specified in Section T.102 for Thrie-Beam to Vertical Wall Bridge Barrier Transition will be measured by the unit each, acceptably completed. The price per each shall include furnishing, post, rail, offset brackets, delineators, hardware, installation, and modifications to bridge barriers and concrete barriers.

Payment for Thrie-Beam to Vertical Wall Bridge Barrier Transition will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 103 PERMANENT IMPACT ATTENUATING DEVICE, TYPE V (REUSABLE), TEST LEVEL 3

The work specified in Section T.103 for Permanent Impact Attenuating Device, Type V (Reusable), Test Level 3 will be measured by the unit each, acceptably installed as specified. The price per each shall include the furnishing, installation, hardware, base preparation, backup assembly, and transition sections.

Payment for the Permanent Impact Attenuating Device, Type V (Reusable), Test Level 3 will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 104 PERMANENT IMPACT ATTENUATING DEVICE, TYPE II, TEST LEVEL 3 (ENERGY ABSORBING TERMINALS TANGENT)

The work specified in Section T.104 for Permanent Impact Attenuating Device, Type II, Test Level 3 (Energy Absorbing Terminals Tangent) will be measured by the unit each, acceptably installed as specified. The price per each shall include the furnishing, installation, hardware, base preparation, and any necessary transitions.

Payment for the Permanent Impact Attenuating Device, Type II, Test Level 3 (Energy Absorbing Terminals Tangent) will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 105 NOT USED
ITEM 106 NOT USED
ITEM 107 NOT USED
ITEM 108 NOT USED
ITEM 109 NOT USED
ITEM 110 NOT USED
ITEM 111 NOT USED
ITEM 112 NOT USED

ITEM 113 NOT USED
ITEM 114 NOT USED
ITEM 115 NOT USED

ITEM 116 6" YELLOW WATERBORNE PAVEMENT MARKINGS

The work specified in Section T.116 for 6” Yellow Waterborne Pavement Markings will be measured by the linear foot of 6" wide paint line actually placed on the pavement.

Payment for 6” Yellow Waterborne Pavement Markings will be made at the contract unit price bid per linear foot of 6" wide line acceptably applied as specified.

ITEM 117 6" WHITE WATERBORNE PAVEMENT MARKINGS

The work specified in Section T.117 for 6” White Waterborne Pavement Markings will be measured by the linear foot of 6" wide paint line actually placed on the pavement.

Payment for 6” White Waterborne Pavement Markings will be made at the contract unit price bid per linear foot of 6" wide line acceptably applied as specified.

ITEM 118 8" WHITE WATERBORNE PAVEMENT MARKINGS

The work specified in Section T.118 for 8” White Waterborne Pavement Markings will be measured by the linear foot of 8" wide paint line actually placed on the pavement.

Payment for 8” White Waterborne Pavement Markings will be made at the contract unit price bid per linear foot of 8" wide line acceptably applied as specified.

ITEM 119 24" WHITE WATERBORNE PAVEMENT MARKINGS

The work specified in Section T.119 for 24” White Waterborne Pavement Markings will be measured by the linear foot of 24" wide paint line actually placed on the pavement.

Payment for 24” White Waterborne Pavement Markings will be made at the contract unit price bid per linear foot of 24" wide line acceptably applied as specified.

ITEM 120 24" YELLOW WATERBORNE PAVEMENT MARKINGS

The work specified in Section T.120 for 24” Yellow Waterborne Pavement Markings will be measured by the linear foot of 24" wide paint line actually placed on the pavement.

Payment for 24” Yellow Waterborne Pavement Markings will be made at the contract unit price bid per linear foot of 24" wide line acceptably applied as specified.

ITEM 121 SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR W/B

The work specified in Section T.121 for Snowplowable Raised Pavement Marker Two Way Holder with Reflector W/B will be measured by the unit each, acceptably installed. The price per each shall include furnishing materials, hardware, adhesive, and installation.

Payment for Snowplowable Raised Pavement Marker Two Way Holder with Reflector W/B will be made at the Contract unit price bid per each, complete-in-place.

ITEM 122 SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR W/R

The work specified in Section T.122 for Snowplowable Raised Pavement Marker Two Way Holder with Reflector W/R will be measured by the unit each, acceptably installed. The price per each shall include furnishing materials, hardware, adhesive, and installation.

Payment for Snowplowable Raised Pavement Marker Two Way Holder with Reflector W/R will be made at the Contract unit price bid per each, complete-in-place.

ITEM 123 SNOWPLOWABLE RAISED PAVEMENT MARKER TWO WAY HOLDER WITH REFLECTOR Y/R

The work specified in Section T.123 for Snowplowable Raised Pavement Marker Two Way Holder with Reflector Y/R will be measured by the unit each, acceptably installed. The price per each shall include furnishing materials, hardware, adhesive, and installation.

Payment for Snowplowable Raised Pavement Marker Two Way Holder with Reflector Y/R will be made at the Contract unit price bid per each, complete-in-place.

ITEM 124 NOT USED
ITEM 125 NOT USED
ITEM 126 NOT USED
ITEM 127 NOT USED
ITEM 128 NOT USED
ITEM 129 NOT USED
ITEM 130 NOT USED

ITEM 131 POST MOUNTED SIGNS, TYPE A

The work specified in Section T.131 for Post Mounted Signs, Type A will be measured using the two-dimensional method, acceptably completed as specified. The price per square foot shall include new sign material, support posts, fastening devices, installation and all materials and labor listed in Section T.131 and not specifically mentioned here.

Payment for Post Mounted Signs, Type A will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 132 STEEL S OR W BEAM POSTS

The work specified in Section T.132 for Steel S or W Beam Posts will be measured by the weight method, acceptably completed as specified. The price per pound shall include materials, excavation, forming, placement, concrete, steel reinforcement, hardware, breakaway systems, and backfilling.

Payment for Steel S or W Beam Posts will be paid for at the contract unit price bid per pound, acceptably completed as specified and as accepted by the Engineer.

ITEM 133 POST MOUNTED SIGNS, TYPE B

The work specified in Section T.133 for Post Mounted Signs, Type B will be measured using the two-dimensional method, acceptably completed as specified. The price per square foot shall include new sign material, support posts, fastening devices, installation and all materials and labor listed in Section T.133 and not specifically mentioned here.

Payment for Post Mounted Signs, Type B will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 134 POST MOUNTED SIGNS, TYPE F

The work specified in Section T.134 for Post Mounted Signs, Type F will be measured using the two-dimensional method, acceptably completed as specified. The price per square foot shall include new sign material, fastening devices, installation and all materials and labor listed in Section T.134 and not specifically mentioned here.

Payment for Post Mounted Signs, Type F will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 135 STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS

The work specified in Section T.135 for Structure Mounted Flat Sheet Aluminum Signs will be measured using the two-dimensional method, acceptably completed as specified. The price per square foot shall include new sign material, support posts, fastening devices, installation and all materials and labor listed in Section T.135 and not specifically mentioned here. The price per square foot shall also include the removal and return to the Authority of any requested lighting items or devices from the structure mounted signs at CSX and Broad Street bridges, and the removal and disposal of any wastes generated by the work.

Payment for Structure Mounted Flat Sheet Aluminum Signs will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 136 OVERHEAD SIGNAGE STRUCTURE - STRUCTURE MOUNTED FLAT SHEET ALUMINUM SIGNS

The work specified in Section T.136 for Overhead Signage Structure – Structure Mounted Flat Sheet Aluminum Signs will be measured using the two-dimensional method, acceptably completed as specified. The price per square foot shall include new sign material, support posts, fastening devices, installation and all materials and labor listed in Section T.136 and not specifically mentioned here.

Payment for Overhead Signage Structure – Structure Mounted Flat Sheet Aluminum Signs will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 137 NOT USED
ITEM 138 NOT USED
ITEM 139 NOT USED
ITEM 140 NOT USED
ITEM 141 NOT USED
ITEM 142 NOT USED
ITEM 143 NOT USED
ITEM 144 NOT USED
ITEM 145 NOT USED
ITEM 146 NOT USED
ITEM 147 NOT USED
ITEM 148 NOT USED
ITEM 149 NOT USED
ITEM 150 NOT USED
ITEM 151 NOT USED
ITEM 152 NOT USED
ITEM 153 NOT USED
ITEM 154 NOT USED

ITEM 155 NOT USED
ITEM 156 NOT USED
ITEM 157 NOT USED
ITEM 158 NOT USED
ITEM 159 NOT USED
ITEM 160 NOT USED
ITEM 161 NOT USED
ITEM 162 NOT USED

ITEM 163 TYPE C INLET CONCRETE TOP UNIT AND GRATE

The work specified in Section T.163 for Type C Inlet Concrete Top Unit and Grate will be measured by the unit set, acceptably completed. The price per set shall include materials, excavation, grade adjustments, cleaning inlet, forming, placement, backfilling, and restoration.

Payment for Type C Inlet Concrete Top Unit and Grate will be paid for at the contract unit price bid per set, acceptably constructed as specified and as accepted by the Engineer.

ITEM 164 TYPE M INLET CONCRETE TOP UNIT AND GRATE

The work specified in Section T.164 for Type M Inlet Concrete Top Unit and Grate will be measured by the unit set, acceptably completed. The price per set shall include materials, excavation, grade adjustments, cleaning inlet, forming, placement, backfilling, and restoration.

Payment for Type M Inlet Concrete Top Unit and Grate will be paid for at the contract unit price bid per set, acceptably constructed as specified and as accepted by the Engineer.

ITEM 165 ADA COMPLIANT INLET GRATE

The work specified in Section T.165 for ADA Compliant Inlet Grate will be measured by the unit each, acceptably completed. The price per each shall include materials, excavation, grate removal, cleaning inlet, grate placement, backfilling, and restoration.

Payment for ADA Compliant Inlet Grate will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 166 GRADE ADJUSTMENT OF EXISTING INLETS

The work specified in Section T.166 for Grade Adjustment of Existing Inlets will be measured by the unit set, acceptably completed. The price per set shall include materials, excavation, grade adjustments, forming, placement, cleaning, connections, backfilling, and restoration.

Payment for Grade Adjustment of Existing Inlets will be paid for at the contract unit price bid per set, acceptably constructed as specified and as accepted by the Engineer.

ITEM 167 18" REINFORCED CONCRETE PIPE, TYPE A, 15' - 3' FILL, SHORE/TRENCH BOX, 100 YEAR DESIGN LIFE

The work specified in Section T.167 for 18" Reinforced Concrete Pipe, Type A will be measured using the linear method, acceptably installed as specified. The price per linear foot shall include field dimensional check and survey, materials including aggregate, shoring and trench boxes, placement, backfill and compaction, testing and quality control.

Payment for 18" Reinforced Concrete Pipe, Type A will be paid for at the contract unit price bid per linear foot, acceptably installed as specified and as accepted by the Engineer.

ITEM 168 STANDARD INLET BOX, HEIGHT </= 10'

The work specified in Section T.168 for Standard Inlet Box will be measured by the unit each, acceptably completed. The price per each shall include materials, excavation, forming, placement, connections, backfilling, and restoration.

Payment for Standard Inlet Box will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 169 STANDARD DOGHOUSE INLET BOX, HEIGHT </= 10'

The work specified in Section T.169 for Standard Doghouse Inlet Box will be measured by the unit each, acceptably completed. The price per each shall include materials, excavation, forming, placement, connections, backfilling, and restoration.

Payment for Standard Doghouse Inlet Box will be paid for at the contract unit price bid per each, acceptably constructed as specified and as accepted by the Engineer.

ITEM 170 REBUILT INLET BOX WITH MANHOLE TOP

The work specified in Section T.170 for Rebuilt Inlet Box With Manhole Top will be measured by the unit each, acceptably completed. The price per each shall include materials, excavation, forming, placement, cleaning Manhole, backfilling, and restoration.

Payment for Rebuilt Inlet Box With Manhole Top will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 171 CONNECT TO EXISTING DRAINAGE STRUCTURE

The payment for this item will measured by the unit each, acceptably completed and includes the excavation of the trench, temporary stockpiling of the removed material, construction of the bedding, placement of the pipe, backfilling of the trench, and restoration of the surface including placement of bituminous paving where required. The modifications to the existing outlet drainage pipe or manhole to accomplish the connection are also included.

Payment for Connect To Existing Drainage Structure will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 172 CLEANING EXISTING PIPE CULVERTS DIAMETERS UP TO AND INCLUDING 36"

The work specified in Section T.172 for Cleaning Existing Pipe Culverts Diameters Up To And Including 36" will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include cleaning, waste disposal, and repairs necessary due to cleaning operations.

Payment for Cleaning Existing Pipe Culverts Diameters Up To And Including 36" will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 173 REPAIR SEWER CONNECTION

The payment for this item will be measured by the unit each, acceptably completed and includes the excavation of the trench, temporary stockpiling of the removed material, construction of the bedding, placement of the pipe, backfilling of the trench, and restoration of the surface including placement of bituminous paving where required. The modifications to the existing outlet drainage pipe or manhole to accomplish the connection are also included. Management of existing soil/embankment material associated with this task is included in Items T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

Payment for Repair Sewer Connection will be paid for at the contract lump unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 174 CLEANING DRAINAGE STRUCTURES

The work specified in Section T.174 for Cleaning Drainage Structures will be measured by the unit each, acceptably completed as specified. The price per each shall include cleaning, waste disposal, and repairs necessary due to cleaning operations.

Payment for Cleaning Drainage Structures will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 175 NOT USED
ITEM 176 NOT USED
ITEM 177 NOT USED
ITEM 178 NOT USED
ITEM 179 NOT USED
ITEM 180 NOT USED
ITEM 181 NOT USED
ITEM 182 NOT USED
ITEM 183 NOT USED
ITEM 184 NOT USED
ITEM 185 NOT USED
ITEM 186 NOT USED
ITEM 187 NOT USED
ITEM 188 NOT USED
ITEM 189 NOT USED
ITEM 190 NOT USED
ITEM 191 NOT USED
ITEM 192 NOT USED
ITEM 193 NOT USED
ITEM 194 NOT USED
ITEM 195 NOT USED
ITEM 196 NOT USED
ITEM 197 NOT USED
ITEM 198 NOT USED
ITEM 199 NOT USED

ITEM 200 COMPOST FILTER SOCK, 12" DIAMETER

The work specified in Section T.200 for Compost Filter Sock, 12" Diameter will be measured using the linear method, acceptably installed as specified. The price per linear foot shall include excavation, materials, support posts, fasteners, maintenance and removal.

Payment for Compost Filter Sock, 12” Diameter will be paid for at the contract unit price bid per linear foot, acceptably installed as specified and as accepted by the Engineer.

ITEM 201 COMPOST FILTER SOCK, 18" DIAMETER

The work specified in Section T.201 for Compost Filter Sock, 18" Diameter will be measured using the linear method, acceptably installed as specified. The price per linear foot shall include excavation, materials, support posts, fasteners, maintenance and removal.

Payment for Compost Filter Sock, 18" Diameter will be paid for at the contract unit price bid per linear foot, acceptably installed as specified and as accepted by the Engineer.

ITEM 202 COMPOST FILTER SOCK, 24" DIAMETER

The work specified in Section T.202 for Compost Filter Sock, 24" Diameter will be measured using the linear method, acceptably installed as specified. The price per linear foot shall include excavation, materials, support posts, fasteners, maintenance and removal.

Payment for Compost Filter Sock, 24" Diameter will be paid for at the contract unit price bid per linear foot, acceptably installed as specified and as accepted by the Engineer.

ITEM 203 INLET FILTER BAG FOR TYPE M INLET

The work specified in Section T.203 for Inlet Filter Bag For Type M Inlet will be measured by the unit each, acceptably installed as specified. The price per each shall include installation, materials, fasteners, maintenance, removal, and disposal.

Payment for Inlet Filter Bag For Type M Inlet will be paid for at the contract unit price bid per each, acceptably installed as specified and as accepted by the Engineer.

ITEM 204 INLET FILTER BAG FOR TYPE C INLET

The work specified in Section T.204 for Inlet Filter Bag For Type C Inlet will be measured by the unit each, acceptably installed as specified. The price per each shall include installation, materials, fasteners, maintenance, removal, and disposal.

Payment for Inlet Filter Bag For Type C Inlet will be paid for at the contract unit price bid per each, acceptably installed as specified and as accepted by the Engineer.

ITEM 205 PIPE/GRAVEL INLET PROTECTION FOR TYPE M INLET

The work specified in Section T.205 for Pipe/Gravel Inlet Protection For Type M Inlet will be measured by the unit each, acceptably installed as specified. The price per each shall include all materials, excavation, installation, inspection, maintenance, removal, disposal, and any backfill/compaction necessary.

Payment for Pipe/Gravel Inlet Protection For Type M Inlet will be paid for at the contract unit price bid per each, acceptably installed as specified and as accepted by the Engineer.

ITEM 206 PIPE/GRAVEL INLET PROTECTION FOR TYPE C INLET

The work specified in Section T.206 for Pipe/Gravel Inlet Protection For Type C Inlet will be measured by the unit each, acceptably installed as specified. The price per each shall include all materials, excavation, installation, inspection, maintenance, removal, disposal, and any backfill/compaction necessary.

Payment for Pipe/Gravel Inlet Protection For Type C Inlet will be paid for at the contract unit price bid per each, acceptably installed as specified and as accepted by the Engineer.

ITEM 207 SILT BARRIER FENCE, 18" HEIGHT

The work specified in Section T.207 for Silt Barrier Fence, 18" Height will be measured using the linear method, acceptably installed as specified. The price per linear foot shall include excavation, materials, support posts, fasteners, backfill and compaction.

Payment for Silt Barrier Fence, 18" Height will be paid for at the contract unit price bid per linear foot, acceptably installed as specified and as accepted by the Engineer.

ITEM 208 SILT BARRIER FENCE, 30" HEIGHT

The work specified in Section T.208 for Silt Barrier Fence, 30" Height will be measured using the linear method, acceptably installed as specified. The price per linear foot shall include excavation, materials, support posts, fasteners, backfill and compaction.

Payment for Silt Barrier Fence, 30" Height will be paid for at the contract unit price bid per linear foot, acceptably installed as specified and as accepted by the Engineer.

ITEM 209 ROCK, CLASS R-3

The work specified in Section T.209 for Rock, Class R-3 will be measured using the three dimensional method, acceptably completed as specified. The quantity shown on the drawings is for information only.

Payment for Rock, Class R-3 will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 210 ROCK APRON

The work specified in Section T.210 for Rock Apron will be measured using the two dimensional method, acceptably completed as specified. The price per square yard shall include excavation, geotextile, and rock placement.

Payment for Rock Apron will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 211 SEEDING FORMULA E

The work specified in Section T.211 for Seeding Formula E will be measured by the weight-method, acceptably placed as specified. The price per pound shall include furnishing, placing, rolling, and tillage.

Payment for Seeding Formula E will be paid for at the contract unit price per pound, acceptably placed as specified and as accepted by the Engineer.

ITEM 212 SEEDING AND SOIL SUPPLEMENTS FORMULA L

The work specified in Section T.212 for Seeding and Soil Supplements Formula L will be measured by the weight-method, acceptably placed as specified. The price per pound shall include furnishing, placing, rolling, and tillage.

Payment for Seeding and Soil Supplements Formula L will be paid for at the contract unit price per pound, acceptably placed as specified and as accepted by the Engineer.

ITEM 213 TEMPORARY SHORT-TERM, ROLLED EROSION CONTROL PRODUCT, TYPE 2D

The work specified in Section T.213 for Temporary Short-Term, Rolled Erosion Control Product, Type 2D will be measured using the two dimensional method, acceptably completed as specified. The price per square yard shall include furnishing, placement, and maintenance.

Payment for Temporary Short-Term, Rolled Erosion Control Product, Type 2D will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 214 MULCHING – STRAW

The work specified in Section T.214 for Mulching - Straw will be measured by the weight-method, acceptably placed as specified. The price per ton shall include furnishing, placement, anchoring, and maintenance.

Payment for Mulching - Straw will be paid for at the contract unit price per ton, acceptably placed as specified and as accepted by the Engineer.

ITEM 215 COMPOST SOCK WASHOUT

The work specified in Section T.215 for Compost Sock Washout will be measured by the unit each, acceptably installed as specified. The price per each shall include furnishing of compost socks, wood stakes, and geomembranes, along with maintaining and removal of the devices.

Payment for Compost Sock Washout will be paid for at the contract unit price bid per each, acceptably installed as specified and as accepted by the Engineer.

ITEM 216 PUMPED WATER FILTER BAG

The work specified in Section T.216 for Pumped Water Filter Bag will be measured using the unit each, acceptably completed as specified. The price per each shall include materials, placement, maintenance and removal.

Payment for Pumped Water Filter Bag will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 217 REPLACEMENT PUMPED WATER FILTER BAG

The work specified in Section T.217 for Replacement Pumped Water Filter Bag will be measured using the unit each, acceptably completed as specified. The price per each shall include materials, placement, maintenance and removal.

Payment for Replacement Pumped Water Filter Bag will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 218 SUMP PIT

The work specified in Section T.218 for Sump Pit will be measured using the unit each, acceptably completed as specified. The price per each shall include materials, excavation, placement, maintenance, and removal.

Payment for Sump Pit will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 219 ROCK CONSTRUCTION ENTRANCE

The work specified in Section T.219 Rock Construction Entrance will be measured by the unit each (each entrance), acceptably completed as specified. The price per each shall include all labor, materials, and equipment necessary to install, maintain, and remove the entrances.

Payment for Rock Construction Entrance will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 220 NOT USED
ITEM 221 NOT USED
ITEM 222 NOT USED
ITEM 223 NOT USED
ITEM 224 NOT USED
ITEM 225 NOT USED
ITEM 226 NOT USED
ITEM 227 NOT USED
ITEM 228 NOT USED
ITEM 229 NOT USED
ITEM 230 NOT USED

ITEM 231 AWG #2, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

The work specified under Sections T.231, AWG #2, Underground Copper Cable, 1 Conductor, shall be measured by the number of linear feet of new copper cable installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Sections T.231, AWG #2, Underground Copper Cable, 1 Conductor.

Payment for AWG #2, Underground Copper Cable, 1 Conductor will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 232 AWG #4, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

The work specified under Sections T.232, AWG #4, Underground Copper Cable, 1 Conductor, shall be measured by the number of linear feet of new copper cable installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Sections T.232, AWG #4, Underground Copper Cable, 1 Conductor.

Payment for AWG #4, Underground Copper Cable, 1 Conductor will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 233 TRENCH AND BACKFILL, TYPE I

The work specified under Section T.233, Trench and Backfill, Type I, shall be measured by the number of linear feet of trench and backfill completed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Section T.233, Trench and Backfill, Type I, including excavation, backfilling, temporary, and permanent plastic trench markers.

Disposal of soils and associated analytical testing are not included in this cost item. Work required for characterization and disposal of soils is included in Items T.401. T.402, T.403, T.405, T.406, and T.407.

Payment for Trench and Backfill, Type I will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 234 TRENCH AND BACKFILL, TYPE II

The work specified under Section T.234, Trench and Backfill, Type II, shall be measured by the number of linear feet of trench and backfill completed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Section T.234, Trench and Backfill, Type II, including excavation, backfilling, temporary, and permanent plastic trench markers.

Disposal of soils and associated analytical testing are not included in this cost item. Work required for characterization and disposal of soils is included in Items T.401. T.402, T.403, T.405, T.406, and T.407.

Payment for Trench and Backfill, Type II will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 235 HORIZONTAL BORING

The work specified under Section T.235, Horizontal Boring, shall be measured by the number of linear feet of boring completed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Section T.235, Horizontal Boring, including boring pits, all outer conduit sleeves, casings, hardware, equipment, materials, coordination,

maintenance and protection of traffic as required, labor and all other ancillary materials and equipment required and/or needed for complete and safe boring operations.

Disposal of soils and associated analytical testing are not included in this cost item. Work required for characterization and disposal of soils is included in Items T.401. T.402, T.403, T.405, T.406, and T.407.

Payment for Horizontal Boring will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 236 CONDUIT ATTACHMENT TO STRUCTURE

The work specified under Section T.236, Conduit Attachment to Structure, shall be measured by the number of linear feet of conduit attachment completed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Section T.236, Conduit Attachment to Structure, including all connections, drilled holes in existing structures, mounting brackets and hardware, spacers, fittings, joints, bends, flexible conduit terminators, adapters, etc. required for the installation of the conduit.

Payment for Conduit Attachment to Structure will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 237 2 INCH DIRECT BURIAL CONDUIT (PVC)

The work specified under Section T.237, 2 Inch Direct Burial Conduit (PVC), shall be measured by the number of linear feet of new 2-inch PVC conduit installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Section T.237, 2 Inch Direct Burial Conduit (PVC), including fittings, expansion/deflection fittings, joints, bends, grounds, protective coatings, appurtenances, excavation, backfill, and soil, seed and mulch to repair areas disturbed during installation.

Payment for 2 Inch Direct Burial Conduit (PVC) will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 238 2 INCH EXPOSED CONDUIT (RMC)

The work specified under Section T.238, 2-Inch Exposed Conduit (RMC), shall be measured by the number of linear feet of new 2-inch rigid metallic conduit installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Section T.238, 2 Inch Exposed Conduit (RMC), including conduit sleeves, fittings, expansion/deflection fittings, joints, bends, grounds, protective coatings, appurtenances, excavation, backfill, and soil, seed and mulch to repair areas disturbed during installation.

Payment for 2 Inch Exposed Conduit (RMC) will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 239 COMMUNCIATIONS JUNCTION BOX, JB-11

The work specified under Section T.239, Communications Junction Box, JB-11, shall be measured by the number of new communications junction boxes installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per each communications junction box shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.239, Communications Junction Box, JB-11, including, but not limited to, furnishing and installing a communications junction box, ground wire, ground rod, ground clamp, and necessary excavations, backfill, and soil, seed and mulch to repair adjacent areas disturbed during installation.

Payment for Communications Junction Box, JB-11 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 240-242 AIR BLOWN FIBER OPTIC CABLE, 6 STRAND, 12 STRAND, 24 STRAND

The work specified under Sections T.240-T.242, Air Blown Fiber Optic Cable, 6 Strand, 12 Strand, and 24 Strand, shall be measured by the number of linear feet of new fiber optic cable installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Sections T.240-T.242, Air Blown Fiber Optic Cable, 6 Strand, 12 Strand, and 24 Strand. Separate payment will be made for each type of fiber optic cable installation as follows:

- Item 240 – Air Blown Fiber Optic Cable, 6 Strand
- Item 241 – Air Blown Fiber Optic Cable, 12 Strand

- Item 242 – Air Blown Fiber Optic Cable, 24 Strand

Payment for Air Blown Fiber Optic Cable, 6 Strand, 12 Strand, 24 Strand will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 243 ITS SYSTEM, COMPLETE POWER SUPPLY

The work specified under Section T. 243, ITS System, Complete Power Supply, is a lump sum item as set forth in the Schedule and will be measured as a single unit of work completed in accordance with the specifications and accepted by the Engineer.

The lump sum price bid for Section T.243, ITS System, Complete Power Supply, shall include furnishing and installation of all necessary power supply equipment, required and/or needed electrical materials, components, and subsystems required for a completed electrical/power supply system as specified. It also includes the complete testing of all electrical cables, conductors, terminals, grounding system, connections, and required and/or needed electrical materials, components, and subsystems required for a completed electrical/power supply system as specified.

Payment for ITS System, Complete Power Supply will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 244 VARIABLE MESSAGE SIGN SYSTEM, WALK-IN

The work specified under Section T.244, Variable Message Sign System, Walk-In, is a lump sum item as set forth in the Schedule and will be measured as a single unit of work completed in accordance with the specifications and accepted by the Engineer.

The lump sum price bid shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.244, Variable Message Sign System, Walk-In, including, but not limited to, furnishing and installing six (6) fully-functional, tested, and debugged variable message signs (Daktronics VF-2020-96x352-20-RGB), controllers, and communication and power cables to connect each sign to its remote node cabinet. Payment will be made in accordance with the following schedule:

- 75% of the total lump sum price bid for this item will be paid upon delivery of all six (6) of the Variable Message Sign Systems.

- 25% of the total lump sum price bid for this item will be paid upon successful completion of the Final System Acceptance Test as specified under Section T.250, ITS Systems Testing.

Payment for Variable Message Sign System, Walk-in will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 245 VARIABLE SPEED LIMIT SIGN SYSTEM, FRONT ACCESS

The work specified under Section T.245, Variable Speed Limit Sign System, Front Access, is a lump sum item as set forth in the Schedule and will be measured as a single unit of work completed in accordance with the specifications and accepted by the Engineer.

The lump sum price bid shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.245, Variable Speed Limit Sign System, Front Access, including, but not limited to, furnishing and installing of seven (7) fully-functional, tested, and debugged LED variable speed limit signs (Daktronics VS-5229-2-18-W) with integrated controllers, including all associated attachment hardware, communication cables, and power cables. Payment will be made for this item in accordance with the following schedule:

- 75% of the total lump sum price bid for this item will be paid upon delivery of all seven (7) of the variable speed limit signs and system components in accordance with the specifications and accepted by the Engineer.
- 25% of the total lump sum price bid for this item will be paid upon successful completion of the Final System Acceptance Test as specified under Section T.250, System Testing and accepted by the Engineer.

Payment for Variable Speed Limit Sign System, Front Access will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 246 LANE USE CONTROL SIGNAL SYSTEM, FRONT ACCESS

The work specified under Section T.246, Lane Use Control Signal, Front Access, is a lump sum item as set forth in the Schedule and will be measured as a single unit of work completed in accordance with the specifications and accepted by the Engineer.

The lump sum price bid shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.246, Lane Use Control Signal, Front Access, including, but not limited to, furnishing and installing of eleven (11) fully-functional, tested, and debugged LED lane use control signals (Daktronics VM-1020-7x10-66-RG), and controllers, including all associated attachment hardware, communication cables, and power cables. Payment will be made in accordance with the following schedule:

- 75% of the total lump sum price bid for this item will be paid upon delivery of all eleven (11) of the lane use control signals and system components in accordance with the specifications and accepted by the Engineer.
- 25% of the total lump sum price bid for this item will be paid upon successful completion of the Final System Acceptance Test as specified under Section T.250, System Testing and accepted by the Engineer.

Payment for Lane Use Control Signal System, Front Access will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 247 CCTV CAMERA SYSTEM, STRUCTURE MOUNT

The work specified under Section T.247, CCTV Camera System, Structure Mount, shall be measured by the number of cameras installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per camera shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T T.247, CCTV Camera System, Structure Mount, including, but not limited to, furnishing and installing of five (5) fully-functional, tested, and debugged CCTV cameras (BOSCH Autodome IP Starlight 7000 HD IP CCTV Camera), including all CCTV camera assembly components, attachment hardware and materials, surge protection, and all cabling (including Cat-6) and connectors from the CCTV camera to the field enclosure. Includes furnishing, installation, integration, set-up, terminations, and testing for each CCTV camera site and all other incidental and ancillary components and materials needed or required for a complete and operational CCTV camera site.

Payment for CCTV Camera System, Structure Mount will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 248 ITS DEVICE FIELD ENCLOSURE, STRUCTURE MOUNT

The work specified under Section T.248, ITS Field Device Enclosure, Structure Mount, shall be measured by the number of cabinets installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per cabinet shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.248, ITS Field Device Enclosure, Structure Mount, including, but not limited to, furnishing and installing a cabinet, distribution panel, breakers, cabinet light, outlets, surge protection, fan, heater, and wiring.

Payment for ITS Device Field Enclosure, Structure Mount will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 249 ITS DEVICE FIELD ENCLOSURE, GROUND MOUNT

The work specified under Section T.249, ITS Device Field Enclosure, Ground Mount shall be measured by the number of cabinets installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per cabinet shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.249, ITS Device Field Enclosure, Ground Mount, including, but not limited to, furnishing and installing a cabinet, concrete foundation, ground rod, distribution panel, breakers, cabinet light, outlets, surge protection, fan,

heater, wiring and necessary excavation, backfill, and soil, seed and mulch to repair adjacent areas disturbed during installation.

Payment for ITS Device Field Enclosure, Ground Mount will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 250 ITS SYSTEM TESTING (INCIDENTAL)

The work specified under Section T.250, ITS System Testing, shall be incidental to the work specified under Section T.244 Variable Message Sign System, Walk-In, Section T.245, Variable Speed Limit Sign System, Front Access, Section T.246, Lane Use Control Signal, Front Access, and Section T.247, CCTV Camera System, Structure Mount.

The lump sum price bid for Section T.244 Variable Message Sign System, Walk-In; Section T.245, Variable Speed Limit Sign System, Front Access; and Section T.246, Lane Use Control Signal, Front Access; and the unit price bid for Section T.247, CCTV Camera System, Structure Mount shall include all testing specified in Section T.250, ITS System Testing. No separate payment for testing of each system will be made to the Contractor.

ITEM 251-253 FIBER OPTIC TERMINATION PATCH PANELS, 6 PORT, 12 PORT, and 24 PORT

The work specified under Sections T.251-T.253, Fiber Optic Termination Patch Panels, 6 Port, 12 Port, and 24 Port, shall be measured by the number of fiber optic termination patch panels installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per termination patch panel shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Sections T.251-T.253, Fiber Optic Termination Patch Panels, 6 Port, 12 Port, and 24 Port. Separate payment will be made for each type of termination patch panel installed as follows:

- Item 251 – Fiber Optic Termination Patch Panels, 6 Port
- Item 252 – Fiber Optic Termination Patch Panels, 12 Port
- Item 253 – Fiber Optic Termination Patch Panels, 24 Port

Payment for Fiber Optic Termination Patch Panels, 6 Port, 12 Port, and 24 Port will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 254 FIBER OPTIC PATCH CABLES

The work specified under Section T.254, Fiber Optic Patch Cables, is an each item as set forth in the Schedule and will be measured by the number of fiber optic patch cables installed in accordance with the specifications and accepted by the Engineer.

The unit price bid shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.254, Fiber Optic Patch Cables, including, but not limited to, furnishing and installing single mode ST-LC and LC-LC cables.

Payment for Fiber Optic Patch Cables will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 255 COMUNICATION SYSTEM

The work specified under Section T. 255, Communication System, is a lump sum item as set forth in the Schedule and will be measured as a single unit of work completed in accordance with the specifications and accepted by the Engineer.

The lump sum price bid for Section T. 255, Communication System, shall include furnishing and installation of all Distributed Control Units (DCUs), communication cables, and required and/or needed materials, components, and subsystems required for a completed communication system as specified. It also includes the complete testing of all Distributed Control Units (DCUs), communication cables, and required and/or needed electrical materials, components, and subsystems required for a completed communication system as specified.

Payment for Communication System will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 256 ETHERNET SWITCH

The work specified under Section T.256, Ethernet Switch, shall be measured by the number of Ethernet switches installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per switch shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.256, Ethernet Switch, including, but not limited to, furnishing and installing Cisco IE 4000 Ethernet switches.

Payment for Ethernet Switch will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 257 ETHERNET MEDIA CONVERTER

The work specified under Section T.257, Ethernet Media Converter, shall be measured by the number of media converters installed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per media converter shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.257, Ethernet Media Converter.

Payment for Ethernet Media Converter will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 258 ITS DEVICE SPARE PARTS

The work specified under Section T.258, ITS Device Spare Parts is a lump sum item as set forth in the Schedule and will be measured as a single unit of work completed in accordance with the specifications and accepted by the Engineer.

The lump sum price bid shall include the cost of all labor, equipment and materials necessary to complete the work as specified in Section T.258, ITS Device Spare Parts. Payment will be made, upon final delivery and acceptance of the spare parts inventory by the Engineer.

Payment for ITS Device Spare Parts will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 259 COORDINATION WITH TRI-M

The work specified under Section T.259, Coordination with Tri-M is a lump sum item as set forth in the Schedule and will be measured as individual units of work performed and completed by Tri-M in accordance with the specifications and accepted by the Engineer.

The lump sum price bid shall include the cost of coordinating with and utilizing Tri-M Building Automation Systems (Tri-M) to initiate and complete all integration work for integrating the new ITS devices being installed within this contract, into the existing Supervisory Control and Data Acquisition (SCADA) system. It also includes the cost of regular coordination meetings/calls with Tri-M and their attendance, as necessary, at project status meetings.

Payment for Coordination with Tri-M will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 260 ITS SYSTEMS TRAINING

The work specified under Section T.260, ITS Systems Training, shall be measured by the number of hours of training completed in accordance with the plans and specifications and accepted by the Engineer.

The unit price bid per hour shall include the cost of all labor, equipment and materials necessary to complete the training as specified in Section T.260, ITS Systems Training, including, but not

limited to, conducting a training program and supplying all necessary installation, operating and maintenance manuals (paper and CD versions) for the Variable Message Sign System, Variable Speed Limit Sign System, Lane Use Control System, and the CCTV Camera System.

Payment for ITS Systems Training will be paid for at the contract unit price bid per hour, acceptably completed as specified and as accepted by the Engineer.

ITEM 261 AWG #3/0, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

The work specified under Sections T.261, AWG #3/0, Underground Copper Cable, 1 Conductor, shall be measured by the number of linear feet of new copper cable installed in accordance with the plans and specifications and as accepted by the Engineer.

The unit price bid per linear foot shall include the cost of all labor, materials and equipment necessary to complete the work as specified in Sections T.261, AWG #3/0, Underground Copper Cable, 1 Conductor.

Payment for AWG #3/0, Underground Copper Cable, 1 Conductor will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 262 NOT USED

ITEM 263 JUNCTION BOX, JB - 11

The work specified in Section T.152 for Junction Box JB - 11 will be measured by the unit each, acceptably completed. The price per each shall include material, hardware, installation, stone and other incidentals as described in Section T.263, and PennDOT's Standard RC-82M.

Payment for Junction Boxes JB - 11 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 264 JUNCTION BOX REMOVAL

The work specified in Section T.168 for Junction Box Removal will be measured by the unit each, acceptably removed. The price per each shall include disconnection, excavation, removal, crating, storage of reusable material or disposal. Back filling and restoring area.

Payment for Remove Existing Junction Box will be paid for at the contract unit price bid per each, acceptably removed as specified and as accepted by the Engineer.

ITEM 265 CAST JUNCTION BOX

The work specified in Section T.265 for Cast Junction Box will be measured by the unit each. The price per each shall include material, hardware, all mounting/support brackets and fastening devices, installation, and other incidentals as described in Section T.265

Payment for Cast Junction Boxes will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 266 LIGHTING POLE FOUNDATION, TYPE FC

The work specified in Section T.266 for Pole Foundation, Type FC will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, excavation, forming, reinforcement, concrete, anchor bolts, and backfilling as described in Section T.266 and PennDOT's Standard RC-80M.

Payment for Pole Foundation, Type FC will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer

ITEM 267 LIGHTING POLE FOUNDATION REMOVAL

The work specified in Section T.267 for Lighting Pole Foundation Removal will be measured by the unit each, acceptably removed. The price per each shall include disconnection, excavation, removal, crating, and storage of reusable material or disposal. Back filling and restoring area, as described in Section T.267.

Payment for Lighting Pole Foundation Removal will be paid for at the contract unit price bid per each, acceptably removed as specified and as accepted by the Engineer.

ITEM 268 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE S INCLUDING 113 WATT LED LUMINAIRE TYPE II DISTRIBUTION

The work specified in Section T.268 for Aluminum Lighting Pole, 30 Foot Mounting Height, Type S Including 113 Watt LED Luminaire Type II Distribution, will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, fastening devices, wiring, grounding devices and all other materials and labor listed and described in Section T.268 not specifically mentioned here, which also includes removal and delivery of existing pole to DRPA storage yard.

Payment for Aluminum Lighting Pole, 30 Foot Mounting Height, Type S Including 113 Watt LED Luminaire Type II Distribution, will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 269 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE A INCLUDING 113 WATT LED LUMINAIRE TYPE II DISTRIBUTION

The work specified in Section T.269 for Aluminum Lighting Pole, 30 Foot Mounting Height, Type A Including 113 Watt LED Luminaire Type II Distribution, will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, fastening devices, wiring, grounding devices and all other materials and labor listed and described in Section T.269 not specifically mentioned here, which also includes removal and delivery of existing pole to DRPA storage yard.

Payment for Aluminum Lighting Pole, 30 Foot Mounting Height, Type A Including 113 Watt LED Luminaire Type II Distribution, will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 270 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE S INCLUDING 113 WATT LED LUMINAIRE TYPE III DISTRIBUTION

The work specified in Section T.270 for Aluminum Lighting Pole, 30 Foot Mounting Height, Type S Including 113 Watt LED Luminaire Type III Distribution, will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, fastening devices, wiring, grounding devices and all other materials and labor listed and described in Section T.270 not specifically mentioned here, which also includes removal and delivery of existing pole to DRPA storage yard.

Payment for Aluminum Lighting Pole, 30 Foot Mounting Height, Type S Including 113 Watt LED Luminaire Type III Distribution, will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 271 ALUMINUM LIGHTING POLE, 30 FOOT MOUNTING HEIGHT, TYPE A INCLUDING 113 WATT LED LUMINAIRE TYPE III DISTRIBUTION

The work specified in Section T.271 for Aluminum Lighting Pole, 30 Foot Mounting Height, Type A Including 113 Watt LED Luminaire Type III Distribution, will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, fastening devices, wiring, grounding devices and all other materials and labor listed and described in Section T.271 not specifically mentioned here, which also includes removal and delivery of existing pole to DRPA storage yard.

Payment for Aluminum Lighting Pole, 30 Foot Mounting Height, Type A Including 113 Watt LED Luminaire Type III Distribution, will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 272 2" DIRECT BURIAL LIGHTING CONDUIT

The work specified in Section T. 272 for 2" Direct Burial Conduit will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include field dimensional checks, shop drawings, materials, fittings and fastening devices as described in Section T.272.

Payment for 2" Direct Burial Lighting Conduit will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 273 2” PVC-COATED RIGID STEEL CONDUIT

The work specified in Section T.273 for 2 Inch PVC-Coated Rigid Steel Conduit will be measured using the linear method, acceptably placed as specified. The price per linear foot shall include furnishing and installation of Exposed conduits on the CSX retaining wall, clamps, supports, mounting hardware, couplings and fittings as described in Section T.273.

Payment for 2 Inch PVC-Coated Steel Conduit will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 274 LIGHTING POLE REMOVAL

The work specified in Section T.274 for Lighting Pole Removal will be measured by the unit each, acceptably removed. The price per each shall include disconnection, pole removal, crating, storage of reusable material, capping of existing conduit and delivery to DRPA storage yard. All work completed as described in Section T.274.

Payment for Lighting Pole Removal will be paid for at the contract unit price bid per each, acceptably removed as specified and as accepted by the Engineer.

ITEM 275 COMPLETE POWER SUPPLY SYSTEM WITH 12” SKIRT, AM-3A

The work specified in Section T.275 for Complete Power Supply System With 12” Skirt, AM-3A will be measured as a lump sum unit, acceptably completed as specified. The price per lump sum shall include all material, arrangements with the power company, connections to existing utility facilities, connection to the backup power supply system and shop drawing submissions. All work completed as described in Section T.275.

Payment for Complete Power Supply System With 12” Skirt, AM-3A will be paid for at the contract unit price bid per lump sum, acceptably completed as specified and as accepted by the Engineer.

ITEM 276 AWG #6, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

The work specified in Section T.276 for AWG #6, Underground Copper Cable, 1 Conductor will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include manufacture's literature, installation, wiring, fastening devices, circuit identification tags, electrical testing.

Payment for AWG #6, Underground Copper Cable, 1 Conductor will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 277 AWG #8, UNDERGROUND COPPER CABLE, 1 CONDUCTOR

The work specified in Section T.277 for AWG #8, Underground Copper Cable, 1 Conductor will be measured using the linear method, acceptably completed as specified. The price per linear foot shall include manufacture's literature, installation, wiring, fastening devices, circuit identification tags, electrical testing.

Payment for AWG #8, Underground Copper Cable, 1 Conductor will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 278 COMPLETE POWER SUPPLY SYSTEM WITH 12” SKIRT

The work specified in Section T.278 for Complete Power Supply System With 12” Skirt, will be measured as a unit each, acceptably completed as specified. The price per each shall include all material, arrangements with the power company, connections to existing utility facilities, connection to the backup power supply system and shop drawing submissions. All work completed as described in Section T.278. This work includes providing electrical services and lighting controllers For AM-1, AM-2, AM-3 and AM-4 as indicated.

Payment for Complete Power Supply System With 12” Skirt will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 279 SCADA CONTROLLER CABINET

The work specified in Section T.279 for Scada Controller Cabinet will be measured by the unit each, acceptably completed as specified. The price per unit each shall include furnishing materials, manufacturer's literature, shop drawings, installation, hookup to new communication system, hookup to lighting Controller and training.

Payment for Scada Controller Cabinet will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 280 TESTING OF ENTIRE POWER SUPPLY SYSTEM AND CONNECTIONS

The work specified in Section T.280 for Testing of Entire Power Supply System and Connections will be measured as a unit each, acceptably completed as specified. The per price unit each shall include all power required to test the entire system and connections.

Payment for Testing of Entire Power Supply System and Connections will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by Engineer.

ITEM 281 TESTING OF ENTIRE LIGHTING SYSTEM

The work specified in Section T.281 for Testing of Entire Lighting System connected to an AM cabinet, will be measured as a unit each, acceptably completed as specified. The per price unit each shall include all power, furnish personnel and equipment required to test the entire system and connections.

Payment for Testing of Entire Lighting System will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 282 TESTING OF ENTIRE SCADA SYSTEM

The work specified in Section T.282 for Testing of Entire SCADA System will be measured as a unit, acceptably completed as specified. The per price unit each shall include all power required to test the entire system and connections.

Payment for Testing of Entire SCADA System will be paid for at the contract unit price bid each, acceptably completed as specified and as accepted by the Engineer.

ITEM 283 LED PEDESTRIAN TUNNEL LUMINAIRE

The work specified in Section T.283 for LED Pedestrian Tunnel Luminaire will be measured by the unit each, acceptably completed. The price per each shall include manufacture's literature installation, wiring, fastening devices, electrical testing and removal of existing clear lens in Protective door of the ceiling cavity and installation of a new clear polycarbonate lens same thickness as the existing lens.

Payment for LED Pedestrian Tunnel Luminaire will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 284 SIGN LIGHTING 2 LED LUMINAIRES, STRUCTURE S-1

The work specified in Section T. 284 for Sign Lighting 2 LED Luminaires, Structure S-1, will be

measured as a unit for the sign structure, acceptably completed as specified. The lump sum price for the structure shall include all equipment, Luminaires, Disconnect Cabinet, mounting hardware, conduit, grounding hardware, wire, connections, any incidentals required to mount and energize luminaires on a sign structure and shop drawing submissions.

Payment for Sign Lighting 2 LED Luminaires, Structure S-1, will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 285 SIGN LIGHTING 2 LED LUMINAIRES, CSX TUNNEL STRUCTURE

The work specified in Section T. 285 for Sign Lighting 2 LED Luminaires, CSX Tunnel Structure, will be measured as a unit for the sign structure, acceptably completed as specified. The lump sum price for the sign shall include all equipment, Luminaires, Disconnect Cabinet, mounting hardware, conduit, grounding hardware, wire, connections, any incidentals required to mount and energize luminaires on a sign structure and shop drawing submissions.

Payment for Sign Lighting 2 LED Luminaires, CSX Tunnel Structure, will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 286 NOT USED

ITEM 287 ROADWAY TUNNEL (CSX OVERPASS) LED LUMINAIRE LIGHTING SYSTEM

The work specified in Section T. 287 for Roadway Tunnel (CSX Overpass) LED Luminaire Lighting System, will be measured as a unit for the system, acceptably completed as specified. The lump sum price for the system shall include all equipment, Luminaires, mounting hardware, Junction Boxes, conduit, wire, connections, any incidentals required to mount and energize luminaires on the system and shop drawing submissions.

Payment for Roadway Tunnel (CSX Overpass) LED Luminaire Lighting System, will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 288 LED 4 FLASHING CHEVRON SYSTEM

The work specified in Section T.288 for LED 4 Flashing Chevron System will be measured as a unit for the system, acceptably completed as specified. The lump sum price for the system shall include all equipment, LED Flashing Chevron Signs, Control Cabinet, Power Supply, Flash Controllers, and necessary pole mounting hardware.

Payment for LED 4 Flashing Chevron System will be paid for at the contract lump sum price bid,

acceptably completed as specified and as accepted by the Engineer.

ITEM 289 LED 12 FLASHING CHEVRON SYSTEM

The work specified in Section T.289 for LED 12 Flashing Chevron System will be measured as a unit for the system, acceptably completed as specified. The lump sum price for the system shall include all equipment, LED Flashing Chevron Signs, Control Cabinet, Power Supply, Flash Controllers, and necessary pole mounting hardware.

Payment for LED 12 Flashing Chevron System will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 290 FOUNDATION TYPE SPF

The work specified in Section T.290 for Foundation Type SPF will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, excavation, forming, reinforcement, concrete, anchor bolts, and backfilling as described in Section T.290 and NJDOT's Standard Electrical Details T-1707- Foundation Type "SPF".

Payment for Foundation Type SPF will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 291 PEDESTRIAN SIGNAL STANDARD, 10 FOOT

The work specified in Section T.291 for Pedestrian Signal Standard, 10 Foot will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, fastening devices, wiring, grounding devices and all other materials and labor listed and described in Section T.291 not specifically mentioned here, which also includes removal and delivery of existing pole to DRPA storage yard.

Payment for Pedestrian Signal Standard, 10 Foot will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 292 LED UNDERDECK COBRA HEAD LUMINAIRE

The work specified in Section T.292 for LED Underdeck Cobra Head Luminaire, will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, Mounting hardware, wiring, and all other materials and labor listed and described in Section T.292 not specifically mentioned here, which also includes removal and delivery of existing cobra head luminaires to DRPA storage yard.

Payment for LED Underdeck Cobra Head Luminaire, will be paid for at the contract unit price

bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 293 LED UNDERDECK WALL MOUNT LUMINAIRE

The work specified in Section T.293 for LED Underdeck Wall Mount Luminaire will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, mounting hardware, new conduit, and wiring, and all other materials and labor listed and described in Section T.293 not specifically mentioned here, which also includes removal and delivery of existing underdeck luminaires to DRPA storage yard.

Payment for LED Underdeck Wall Mount Luminaire will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 294 JUNCTION BOX, JB-11, NEW LID

The work specified in Section T.294 for Junction Box, JB-11, New Lid, will be measured by the unit each, acceptably completed. The price per each shall include shop drawings, furnishing and installing a Junction Box Lid type JB-11 as directed by the Engineer, as described in Section T.294 which also includes removal and disposal or delivery of existing Junction Box lid to DRPA storage yard as directed by the Engineer.

Payment for Junction Box, JB-11, New Lid will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 295 NOT USED

ITEM 296 SIGN LIGHTING 4 LED LUMINAIRES, STRUCTURE S-19

The work specified in Section T. 296 for Sign Lighting 4 LED Luminaires, Structure S-19, will be measured as a unit for the sign structure, acceptably completed as specified. The lump sum price for the structure shall include all equipment, Luminaires, Disconnect Cabinet, mounting hardware, conduit, grounding hardware, wire, connections, any incidentals required to mount and energize luminaires on a sign structure and shop drawing submissions.

Payment for Sign Lighting 4 LED Luminaires, Structure S-19, will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer

ITEM 297 UNFORESEEN WWB INFRASTRUCTURE REPAIR

The work specified in Section T.297 for Unforeseen WWB Infrastructure Repair will be measured using the pre-determined amount method, acceptably completed as specified. The

price per pre-determined amount shall include constructing, furnishing and/or installing material/equipment to correct any unforeseen existing broken material/equipment or problems which arise during construction, that would holdup further progress or could also be used to correct an existing problem that could lead to harm of newly installed material/equipment. This item shall only be used when directed by the Engineer.

Payment for Unforeseen WWB Infrastructure Repair is a pre-determined amount, and will be based on actual costs incurred by the Contractor on a force account or agreed to price for work acceptably completed. Any money remaining in this item at the end of the project will be credited to the Authority.

ITEM 298 NOT USED
ITEM 299 NOT USED
ITEM 300 NOT USED
ITEM 301 NOT USED
ITEM 302 NOT USED
ITEM 303 NOT USED
ITEM 304 NOT USED
ITEM 305 NOT USED
ITEM 306 NOT USED
ITEM 307 NOT USED
ITEM 308 NOT USED
ITEM 309 NOT USED
ITEM 310 NOT USED
ITEM 311 NOT USED
ITEM 312 NOT USED

ITEM 313 SCARIFICATION, 1 ¾" DEPTH

The work specified in Section T.313 for Scarification, 1 ¾" Depth will be measured by the unit Square Yard, acceptably completed. The price per Square Yard is for the full 1 3/4-inch uniform depth of scarification satisfactorily completed, regardless of how many passes are made with the scarifying equipment, and includes all labor, material and equipment required to complete the work, including removal and disposal of all wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Preparation of surfaces by hydrodemolition to be performed after scarification is included in Item 315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION.

Placement of new latex modified concrete overlay is part of Item 316 – LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH.

Payment for Scarification, 1 ¾" Depth will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 314 SCARIFICATION, 1" DEPTH

The work specified in Section T.314 for Scarification, 1" Depth will be measured by the unit Square Yard, acceptably completed. The price per Square Yard is for the full 1-inch uniform depth of scarification satisfactorily completed, regardless of how many passes are made with the scarifying equipment, and includes all labor, material and equipment required to complete the work, including removal and disposal of all wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Preparation of surfaces by hydrodemolition to be performed after scarification is included in Item 315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION.

Placement of new latex modified concrete overlay is part of Item 317 – LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH

Payment for Scarification, 1" Depth will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 315 CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION

The work specified in Section T.315 for Concrete Bridge Deck Surface Preparation Using Hydrodemolition will be measured by the unit Square Yard, acceptably completed. The price per Square Yard is for the square yard area of bridge deck and approach slab (where applicable) regardless of the number of passes, and includes all labor, material and equipment required to complete the work, including removal and disposal of all wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE

AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Preparation of surfaces by scarification to be performed prior to hydrodemolition is part of Items 313 and 314.

Payment for Concrete Bridge Deck Surface Preparation Using Hydrodemolition will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 316 LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH

The work specified in Section T.316 for Latex Modified Concrete Wearing Surface, 2" Depth will be measured by the unit Square Yard, acceptably completed. The price per Square Yard is to place the latex modified concrete overlay at the specified depth, and includes all labor, material and equipment required to complete the work, including removal and disposal of all wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Preparation of surfaces by hydrodemolition to be performed prior to placement of the latex modified concrete wearing surface is included in Item 315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION.

Payment for Latex Modified Concrete Wearing Surface, 2" Depth will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 317 LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH

The work specified in Section T.317 for Latex Modified Concrete Wearing Surface, 1 ¼" Depth will be measured by the unit Square Yard, acceptably completed. The price per Square Yard is to place the latex modified concrete overlay at the specified depth, and includes all labor, material and equipment required to complete the work, including removal and disposal of all wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Preparation of surfaces by hydrodemolition to be performed prior to placement of the latex modified concrete wearing surface is included in Item 315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION.

Payment for Latex Modified Concrete Wearing Surface, 1 ¼" Depth will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 318 LATEX MODIFIED CONCRETE WEARING SURFACE, VARIABLE ADDITIONAL DEPTH

The work specified in Section T.318 for Latex Modified Concrete Wearing Surface, Variable Additional Depth will be measured by the unit Cubic Yard, acceptably completed.

Labor and equipment costs for this item are incidental to Item 316 – LATEX MODIFIED CONCRETE WEARING SURFACE, 2" DEPTH and Item 317 – LATEX MODIFIED CONCRETE WEARING SURFACE, 1 ¼" DEPTH.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Preparation of surfaces by hydrodemolition to be performed prior to placement of the latex modified concrete wearing surface is included in Item 315 – CONCRETE BRIDGE DECK SURFACE PREPARATION USING HYDRODEMOLITION

Payment for Latex Modified Concrete Wearing Surface, Variable Additional Depth will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 319 APPLICATION OF PENETRATING SEALER TO REINFORCED CONCRETE SUPERSTRUCTURE SURFACES

The work specified in Section T.319 for Application of Penetrating Sealer to Reinforced Concrete Superstructure Surfaces will be measured by the unit Square Yard, acceptably completed. The price per Square Yard shall include the square yard area of surfaces to which the penetrating sealer is applied, as indicated or directed. The work includes access, and all labor, material, and equipment necessary to complete the work.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Reinforced Concrete Repairs, to be completed prior to application of penetrating sealer, are part of Items 322 through 324.

Epoxy Injection Crack Repair, to be completed prior to application of penetrating sealer, is part of Item 325 – EPOXY INJECTION CRACK REPAIR.

Payment for Application of Penetrating Sealer to Reinforced Concrete Superstructure Surfaces will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 320 APPLICATION OF PENETRATING SEALER TO REINFORCED CONCRETE SUBSTRUCTURE SURFACES

The work specified in Section T.320 for Application of Penetrating Sealer to Reinforced Concrete Substructure Surfaces will be measured by the unit Square Yard, acceptably completed. The price per Square Yard shall include the square yard area of surfaces to which the penetrating sealer is applied, as indicated or directed. The work includes access, and all labor, material, and equipment necessary to complete the work.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Reinforced Concrete Repairs, to be completed prior to application of penetrating sealer, are part of Items 322 through 324.

Epoxy Injection Crack Repair, to be completed prior to application of penetrating sealer, is part of Item 325 – EPOXY INJECTION CRACK REPAIR.

Payment for Application of Penetrating Sealer to Reinforced Concrete Substructure Surfaces will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 321 APPLICATION OF ANTI-GRAFFITI COATING

The work specified in Section T.321 for Application of Anti-Graffiti Coating will be measured by the unit Square Foot, acceptably completed as specified. The price per Square Foot shall include the square foot area of surfaces to which the anti-graffiti coating is applied, as indicated or directed. The work includes access, and all labor, material, and equipment to complete the work. Application of manufacturer recommended sealers, where applicable, and removal of any graffiti, as necessary, within areas to which anti-graffiti coating is to be applied are incidental to this item of work.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Reinforced Concrete Repairs, to be completed prior to application of anti-graffiti coatings, are part of Items 322 through 324.

Epoxy Injection Crack Repair, to be completed prior to application of anti-graffiti coatings, is part of Item 325 – EPOXY INJECTION CRACK REPAIR.

Payment for Application of Anti-Graffiti Coating will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 322 REINFORCED CONCRETE REPAIR – TYPE 1
ITEM 323 REINFORCED CONCRETE REPAIR – TYPE 2
ITEM 324 REINFORCED CONCRETE REPAIR – TYPE 3

The work specified in Section T.322 through T.324 for Reinforced Concrete Repair Type 1, Type 2 and Type 3 will be measured by the unit Square Foot, acceptably completed. The price per Square Foot includes, but is not limited to, access, inspection and mark-out, saw cutting, removal of material, drilling, surface preparation, repair work, forming, finishing, curing, and all labor, material and equipment required to complete the work, including the removal and disposal of all wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Application of Penetrating Sealers to be performed after concrete repairs are complete, is part of Items 319 and 320.

Application of Anti-Graffiti Coating, to be performed after concrete repairs are complete, is part of Item 321 – APPLICATION OF ANTI-GRAFFITI COATING.

Payment for Reinforced Concrete Repair – Type 1, 2, and 3 will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 325 EPOXY INJECTION CRACK REPAIR

The work specified in Section T.325 for Epoxy Injection Crack Repair will be measured by the unit Linear Foot, acceptably completed. The price per Linear Foot shall include the linear footage of cracks sealed by epoxy injection, as indicated or directed. The work includes access, and all labor, material, and equipment to complete the work, and the removal and disposal of any wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Reinforced Concrete Repairs, to be coordinated with epoxy injection crack repair, are part of Items 322 through 324.

Payment for Epoxy Injection Crack Repair will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 326 REPLACE NEOPRENE STRIP SEAL GLAND

The work specified in Section T.326 for Replace Neoprene Strip Seal Gland will be measured by the unit Linear Foot, acceptably completed as specified. Measured out-to-out along the centerline of the final, in place, exposed surfaces of the seal, fabricated structural steel extrusion, and the steel barrier sliding plates, following the vertical and sloped faces of curbs and barriers, resulting in a true length, not a horizontally projected length. Non-exposed surfaces will not be included in the final, in-place measurement. The work includes access, and all labor, material,

and equipment to complete the work, and the removal and disposal of any wastes generated by the work.

Removal and reattachment of existing barrier steel sliding plates, and replacement and installation of any missing barrier steel sliding plate screws is incidental to this item of work.

Taking a sample of the gland and temporarily removing and reattaching the barrier steel sliding plate in order to access the end of the seal, as necessary, is incidental to this item.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Replace Neoprene Strip Seal Gland will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 327 REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS

The work specified in Section T.327 for Replace Neoprene Strip Seal Gland, Randolph Street Overpass will be measured by the unit Linear Foot, acceptably completed as specified. Measured out-to-out along the centerline of the final, in place, exposed surfaces of the seal, fabricated structural steel extrusion, and the steel barrier sliding plates, following the vertical and sloped faces of curbs and barriers, resulting in a true length, not a horizontally projected length. Non-exposed surfaces will not be included in the final, in-place measurement. The work includes access, and all labor, material, and equipment to complete the work, and the removal and disposal of any wastes generated by the work.

The work includes, but is not limited to, saw cutting, removal of the existing neoprene strip seal gland, removal of median glare screen concrete, forms, application of concrete bonding compound, cleaning and coating of existing reinforcement to remain, installation of median glare screen concrete within the blockout, replacement of reinforcing steel, as required, hardware and seals, steel sliding plates, and proper disposal of removed elements.

Removal and reattachment of existing barrier steel sliding plates, and replacement and installation of any missing barrier steel screws is incidental to this item of work.

Taking a sample of the gland and temporarily removing and reattaching the barrier steel sliding plate in order to access the end of the seal, as necessary, is incidental to this item.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Replace Neoprene Strip Seal Gland, Randolph Street Overpass will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 328 REPLACE NEOPRENE STRIP SEAL EXPANSION DAM

The work specified in Section T.328 for Replace Neoprene Strip Seal Expansion Dam will be measured by the unit Linear Foot, acceptably completed as specified. Measured out-to-out along the centerline of the final, in place, exposed surfaces of the seal, fabricated structural steel extrusion, and the steel barrier sliding plates, following the vertical and sloped faces of curbs and barriers, resulting in a true length, not a horizontally projected length. Non-exposed surfaces will not be included in the final, in-place measurement.

The work includes, but is not limited to, saw cutting, removal of the existing expansion dam, removal of deck, backwall, and barrier concrete, and reinforcing steel, forms, application of concrete bonding compound, cleaning and coating of existing reinforcement to remain, installation of new deck, backwall, and barrier concrete and reinforcing steel within the blockouts, including mechanical couplers, as required, installation of new expansion dams, hardware and seals, sliding steel barrier plates, and all labor, material, and equipment to complete the work, and the removal and disposal of any wastes generated by the work.

Painting is incidental. Preparation and coating of existing steel surfaces is to be performed in accordance with Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES. Shop painting of new steel is incidental to the cost of this item (see PennDOT Publication 408/2016, Section 1060).

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Worker protection and environmental management is incidental to the cost of this item. See T.371 - WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Work platforms and protection shields required for this work is part of Item 372 – WORK

PLATFORMS AND PROTECTION SHIELDS.

Payment for Replace Neoprene Strip Seal Expansion Dam will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 329 REPLACE TOOTH EXPANSION JOINT WITH MODULAR EXPANSION JOINT

The work specified in Section T.329 for Replace Tooth Expansion Joint with Modular Expansion Joint will be measured by the unit Linear Foot, acceptably completed as specified. Measured out-to-out of the bridge, along the centerline of the exposed surfaces of the joint, following the vertical and sloped faces of the barriers, resulting in the true length, not a horizontally projected length.

Includes all associated costs required to complete the work, including, but not limited saw cutting, removal of the existing expansion joint, removal of deck, backwall, and barrier concrete, and reinforcing steel, application of concrete bonding compound, cleaning and coating of existing reinforcement to remain, installation of new deck, backwall, and barrier concrete, and reinforcing steel within the blockouts, including mechanical couplers, as required, fabrication and installation of new support and deck beams and modular strip seal expansion joints, hardware and seals, sliding steel barrier plates, proper disposal of removed elements, inspection and testing.

Painting is incidental. Preparation and coating of existing steel surfaces is to be performed in accordance with Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES. Shop painting of new steel is incidental to the cost of this item (see PennDOT Publication 408/2016, Section 1060).

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Worker protection and environmental management is incidental to the cost of this item. See T.371 - WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Replace Tooth Expansion Joint With Modular Expansion Joint will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 330 LONGITUDINAL JOINT SEALING, BRIDGE DECK

The work specified in Section T.330 for Longitudinal Joint Sealing, Bridge Deck will be measured by the unit Linear Foot, acceptably completed. The price per Linear Foot includes, access, removal and disposal of existing joint sealant and backing material, as necessary, surface preparation, installation of new backer rods and joint sealant and all labor, equipment and material required to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Coordinate work with the replacement of the strip seal glands at the Randolph Street Overpass. Replacement of the strip seal glands at the Randolph Street Overpass is part of Item 327 – REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS.

Payment for Longitudinal Joint Sealing, Bridge Deck will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 331 LONGITUDINAL JOINT SEALING, SPLIT GLARE SCREEN MEDIAN BARRIER

The work specified in Section T.331 for Longitudinal Joint Sealing, Split Glare Screen Median Barrier will be measured by the unit Linear Foot, acceptably completed. The price per Linear Foot includes access, removal and disposal of existing joint sealant and backing material, as necessary, surface preparation, installation of new backer rods and joint sealant and all labor, equipment and material required to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Longitudinal Joint Sealing, Split Glare Screen Median Barrier will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 332 JOINT SEALING, SUBSTRUCTURE

The work specified in Section T.332 for Joint Sealing, Substructure will be measured by the unit Linear Foot, acceptably completed. The price per Linear Foot includes access, removal and disposal of existing joint sealant and backing material, as necessary, surface preparation, installation of new backer rods and joint sealant and all labor, material and equipment required to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Reinforced Concrete Repairs, to be coordinated with joint sealing repairs, are part of Items 322 through 324.

Payment for Joint Sealing, Substructure will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 333 SUBSTRUCTURE MORTAR REPOINTING

The work specified in Section T.333 for Substructure Mortar Repointing will be measured by the unit Linear Foot, acceptably completed. The price per Linear Foot shall include the linear footage of mortar repointing, as indicated or directed. The work includes access, and all labor, material, and equipment to complete the work, and the removal and disposal of any wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Substructure Mortar Repointing will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 334 RECONSTRUCT CHEEKWALL

The work specified in Section T.334 for Reconstruct Cheekwall will be measured by the unit Lump Sum, acceptably completed. The price per Lump Sum includes access, and all labor, material, and equipment required to complete the work. Development of a reinforcing bar schedule based on field measurements is incidental to this item of work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Reconstruct Cheekwall will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 335 GRANITE BLOCK SLOPE WALL REPAIR

The work specified in Section T.335 for Granite Block Slope Wall Repair will be measured by the unit Square Foot, acceptably completed as specified. The price per Square Foot shall include the square foot area repaired, as indicated or directed. The work includes access, mark-out of repair areas, and all labor, material, and equipment to complete the work, and the removal and disposal of all debris resulting from the work.

Excavation, and the placement, grading and compaction of subbase are incidental to this item of work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Mortar repairs not associated with the resetting of loose or settled granite blocks or the replacement of missing granite blocks are included in ITEM 336 – GRANITE BLOCK SLOPE WALL MORTAR REPAIR.

Removal of existing granite blocks from slope wall edges for use as salvaged granite blocks, and construction of new cast-in-place cement concrete slope wall edges are included in ITEM 337 – SLOPE WALL EDGE CONSTRUCTION.

Payment for Granite Block Slope Wall Repair will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 336 GRANITE BLOCK SLOPE WALL MORTAR REPAIR

The work specified in Section T.336 for Granite Block Slope Wall Mortar Repair will be measured by the unit Linear Foot, acceptably completed as specified. The price per Linear Foot shall include the linear footage of mortar repaired, as indicated or directed. The work includes access, mark-out of repair areas, and all labor, material, and equipment to complete the work, and the removal and disposal of all debris resulting from the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Mortar repairs associated with the resetting of loose or settled granite blocks or the replacement of missing granite blocks is included in ITEM 335 – GRANITE BLOCK SLOPE WALL REPAIR.

Payment for Granite Block Slope Wall Mortar Repair will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 337 SLOPE WALL EDGE CONSTRUCTION

The work specified in Section T.337 for Slope Wall Edge Construction will be measured by the unit Square Yard, acceptably completed. The price per Square Yard shall include the square yard area of constructed slope wall edge, as indicated or directed. The work includes all labor, material and equipment necessary to complete the work, including, but not limited to removal of existing slope wall edge materials and construction of new slope wall edges. Excavation, embankment fill, grading and compaction of the embankment, top soil and seeding, are incidental to this work. Temporary removal and replacement or removal and relocation of existing chain link fence, as required, including, but not limited to fencing, fence posts, and fence post foundations are incidental to this work.

Management of existing soil/embankment material associated with this task is included in Items T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

Right of Way Fence work shall be in accordance with Section T.75.

Estimated quantities of fence removal and replacement/relocation are as follows:

Seventh Street Overpass: Includes removal and replacement/relocation of up to 6 posts/foundations and 60 LF of fence.

Tenth Street Overpass: Includes removal and replacement/relocation of up to 6 posts/foundations and 60 LF of fence.

Westbound over Passyunk Avenue: Includes removal and replacement/relocation of up to 8 posts/foundations and 80 LF of fence.

Payment for Slope Wall Edge Construction will be paid for at the contract unit price bid per square yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 338 CLEAN DRAINAGE SYSTEM

The work specified in Section T.338 for Clean Drainage System will be measured by the unit Lump Sum, acceptably completed. The price per Lump Sum includes access, cleaning, demonstrating drainage system functionality to the Engineer, collection and disposal of wastes generated by the cleaning operation, and all labor, material and equipment required to complete the work.

Includes the following 36 locations at various structures:

Broad Street – 1 scupper
Ramp M – 5 scuppers
Eastbound over Moyamensing Avenue – 12 scuppers
Westbound over Moyamensing Avenue – 5 scuppers
Eastbound over Passyunk Avenue – 5 scuppers
Westbound over Passyunk Avenue – 6 scuppers
Pedestrian Underpass at Ramp N – 2 inlets

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Drainage system modification is included in Item 340 MODIFY DRAINAGE SYSTEM.

Drainage system repairs are included in Item 343 REPAIR DRAINAGE SYSTEM

Payment for Clean Drainage System will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 339 CLEAN DRAINAGE SYSTEM, CSX RAILROAD OVERPASS

The work specified in Section T.339 for Clean Drainage System, CSX Railroad Overpass will be measured by the unit Lump Sum, acceptably completed. The price per Lump Sum includes temporary removal and replacement of existing ballast in the vicinity of the drains, cleaning, demonstrating drainage system functionality to the Engineer, collection and disposal of wastes generated by the cleaning operation, access, and all labor, material and equipment required to complete the work.

Includes four (4) drain locations.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE

AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Replacement of existing roof drain with new roof drain is part of Item 341 – REPLACE ROOF DRAIN, CSX RAILROAD OVERPASS.

Removal and disposal of existing vegetation in the vicinity of the drains is part of Item 344 – DEBRIS REMOVAL.

All necessary coordination with CSX is part of Item 399 – CSX COORDINATION.

Payment for Clean Drainage System, CSX Railroad Overpass will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 340 MODIFY DRAINAGE SYSTEM

The work specified in Section T.340 for Modify Drainage System will be measured by the unit Each (each scupper location), acceptably completed. The price per Each includes access and all labor, material and equipment necessary to complete the work, including, but not limited to, removing the existing drainage system and furnishing and installing new drainage system, including, but not limited to, all downspouting, connections, fittings, cleanouts, supports, attachments, and drain boxes. Work also includes disconnecting, plugging/capping, and filling the existing (abandoned) drainage system downspouting with concrete.

Management of existing soil/embankment material associated with this task is included in Items T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Tie-in of new drainage system downspouting to existing underground sewer system pipes or manholes, restoration of existing ground, pavement, sidewalks and curbs is part of Item 173 – REPAIR SEWER CONNECTION.

The filling of existing drainage pipes with concrete at locations not requiring drainage system modifications is part of Item 367 – FILL DRAINAGE PIPE WITH CONCRETE.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Modify Drainage System will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 341 REPLACE ROOF DRAIN, CSX RAILROAD OVERPASS

The work specified in Section T.341 for Replace Roof Drain, CSX Railroad Overpass will be measured by the unit Lump Sum, acceptably completed. The price per Lump Sum includes four (4) roof drain locations. Work includes, but is not limited to, access, removal of existing roof drains, furnishing and installation of new roof drains, and all labor, material and equipment required to complete the work, including the removal and disposal of all wastes generated by the work.

Cleaning of the drainage system, including the removal and replacement of existing ballast in the vicinity of the drains, is included in ITEM 339 – CLEAN EXISTING DRAINAGE SYSTEM, CSX RAILROAD OVERPASS.

Removal and disposal of existing vegetation in the vicinity of the drains is in included in ITEM 344 – DEBRIS REMOVAL

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

All necessary coordination with CSX is part of Item 399 – CSX COORDINATION.

Payment for Replace Roof Drain, CSX Railroad Overpass will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 342 REPLACE FLOOR DRAIN DOWNSPOUT, RANDOLPH STREET OVERPASS

The work specified in Section T.342 for Replace Floor Drain Downspout, Randolph Street Overpass will be measured by the unit Lump Sum, acceptably completed. The price per Lump Sum shall include access, and all labor, material, and equipment necessary to remove the existing downspout and install new downspout, including all downspout piping, connections, and miscellaneous components. Disposal of removed portions of existing downspout and existing downspout components is incidental to this item.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Construction of slope wall edges is included in Item 337 – SLOPE WALL EDGE CONSTRUCTION.

Payment for Replace Floor Drain Downspout, Randolph Street Overpass will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 343 REPAIR DRAINAGE SYSTEM

The work specified in Section T.343 for Repair Drainage System will be measured by the unit Each (each drainage downspout location repaired), acceptably completed. The price per Each shall include access, and all labor, material, and equipment necessary to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS

Drainage system cleaning is part of Item 338 – CLEAN DRAINAGE SYSTEM.

Drainage system modifications are part of Item 340 – MODIFY DRAINAGE SYSTEM.

Payment for Repair Drainage System will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 344 DEBRIS REMOVAL

The work specified in Section T.344 for Debris Removal will be measured by the unit Cubic Yard, acceptably completed. The price per Cubic Yard shall include access, removal and disposal of materials, and all labor, material, and equipment to complete the work.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Removal of sand, dust, or other residual material on the roadways, which may interfere with roadway drainage or constitute a traffic hazard is part of Item 6 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Payment for Debris Removal will be paid for at the contract unit price bid per cubic yard, acceptably completed as specified and as accepted by the Engineer.

ITEM 345 JACKING BRIDGE SUPERSTRUCTURE – RANDOLPH STREET
ITEM 346 JACKING BRIDGE SUPERSTRUCTURE – SEVENTH STREET
ITEM 347 JACKING BRIDGE SUPERSTRUCTURE – TENTH STREET
ITEM 348 JACKING BRIDGE SUPERSTRUCTURE – BROAD STREET
ITEM 349 JACKING BRIDGE SUPERSTRUCTURE – RAMP K-L
ITEM 350 JACKING BRIDGE SUPERSTRUCTURE – RAMP M
ITEM 351 JACKING BRIDGE SUPERSTRUCTURE – EB OVER MOYAMENSING
ITEM 352 JACKING BRIDGE SUPERSTRUCTURE – WB OVER MOYAMENSING
ITEM 353 JACKING BRIDGE SUPERSTRUCTURE – EB OVER PASSYUNK

The work specified in Section T.345 through T.353 will be measured by the unit Lump Sum (Lump Sum for each bridge indicated), acceptably completed. The price per Lump Sum includes access, furnishing all material, including, but not limited to all temporary supports, falsework, and foundation work required as a result of the jacking and temporary support scheme. Includes all fabricated structural steel, high strength bolts, nuts and washers, adhesive anchors and threaded rods/anchor bolts rods/anchor bolts. Also includes access to jacking, removal and re-installation or loosening and re-tightening of any existing bridge elements to accommodate the jacking operations, including, but not limited to existing downspouts, conduits, and steel barrier sliding plates. Includes field drilling, installation of jacking assemblies and stiffeners, all temporary supports, excavation, temporary excavation support, matting/cribbing, grillages, removal of jacking assemblies and temporary supports, reconstructing and re-establishing to original condition pavements, sidewalks, curbs or other elements removed and/or damaged as a result of the jacking operations, disposal of materials resulting from the jacking and temporary support operations, and all engineering, labor, material and equipment required to complete the work.

Restoration of existing ground, pavement, sidewalks and curbs is incidental to this item of work. Perform restoration of existing ground, pavement, sidewalks, and curbs in accordance with Sections T.12, T.13, T.15, T.16, T.17, T.18, T.20, T.28, T.39, T.40, and T.212.

Management of existing soil/embankment material associated with this task is included in Items T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Bearing rehabilitation is part of the associated BEARING REHABILIATION items.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Jacking Bridge Superstructure will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 354 BEARING REHABILITATION – TYPE 1
ITEM 355 BEARING REHABILITATION – TYPE 2

The work specified in Section T.354 through T.355 for Bearing Rehabilitation – Type 1 and Type 2, will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work.

Painting is incidental. Preparation and coating of existing steel surfaces is to be performed in accordance with Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES. Shop painting of new steel is incidental to the cost of this item (see PennDOT Publication 408/2016, Section 1060).

Replacement of existing bedding material between beam seat and masonry plate, if required, is incidental to this item of work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Worker protection and environmental management is incidental to the cost of this item. See T.371 - WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Jacking of the bridge superstructure is part of the associated JACKING BRIDGE SUPERSTRUCTURE item.

Payment for Bearing Rehabilitation will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 356 BEARING REHABILITATION – TYPE 3

The work specified in Section T.356 for Bearing Rehabilitation – Type 3 will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work. Measured as each (each bearing location), regardless of the number of anchor bolt void locations requiring filling at that bearing location.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Bearing Rehabilitation – Type 3 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 357 BEARING REHABILITATION – TYPE 4

The work specified in Section T.357 for Bearing Rehabilitation – Type 4 will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Jacking of the bridge superstructure is part of the associated Jacking Bridge Superstructure item.

Payment for Bearing Rehabilitation – Type 4 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 358 BEARING REHABILITATION – TYPE 5
ITEM 359 BEARING REHABILITATION – TYPE 6

The work specified in Section T.358 through T.359 for Bearing Rehabilitation – Type 5 and Type 6, will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Jacking of the bridge superstructure is part of the associated Jacking Bridge Superstructure item.

Payment for Bearing Rehabilitation – Type 5 and 6 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 360 BEARING REHABILITATION – TYPE 7
ITEM 361 BEARING REHABILITATION – TYPE 8

The work specified in Section T.360 through 361 for Bearing Rehabilitation – Type 7 and Type 8, will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work.

Locating existing reinforcing steel and patching areas removed for locating existing reinforcing steel are incidental to this work.

Painting is incidental. Preparation and coating of existing steel surfaces is to be performed in accordance with Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES. Shop painting of new steel is incidental to the cost of this item (see PennDOT Publication 408/2016, Section 1060).

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Resetting of the existing bearing pad is part of Item 358 – BEARING REHABILITATION – TYPE 5.

Replacing of the existing bearing pad is part of Item 359 – BEARING REHABILITATION – TYPE 6.
Worker protection and environmental management is incidental to the cost of this item See T.371 - WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Bearing Rehabilitation – Type 7 and 8 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 362 BEARING REHABILITATION – TYPE 9

The work specified in Section T.362 for Bearing Rehabilitation – Type 9 will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work.

The cutting off and removing of existing anchor bolts associated with other bearing rehabilitation work is included in that bearing rehabiliation item. For example, the cutting and removing of existing anchor bolts associated with Item 360 – BEARING REHABILIATION – TYPE 7, is included in Item 360 – BEARING REHABILITATION – TYPE 7.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Bearing Rehabilitation – Type 9 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 363 BEARING REHABILITATION – TYPE 10

The work specified in Section T.363 for Bearing Rehabilitation – Type 10 will be measured by the unit Each (each bearing location), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work. Measured as each (each bearing location), regardless of the number of missing anchor bolt nuts and washers requiring replacement at that bearing location.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Bearing Rehabilitation – Type 10 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 364 BEARING REHABILITATION – TYPE 11

The work specified in Section T.364 for Bearing Rehabilitation – Type 11 will be measured by the unit Each (each anchor bolt replaced), acceptably completed. The price per Each includes access, and all labor, material and equipment required to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Bearing Rehabilitation – Type 11 will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 365 SPECIAL MORTAR REPAIRS

The work specified in Section T.365 for Special Mortar Repairs will be measured by the unit Square Foot, acceptably completed. The price per Square Foot includes, but is not limited to, access, inspection and mark-out, saw cutting, removal of material, surface preparation, repair work, forming, finishing, curing, and all labor, material, and equipment required to complete the work, including the removal and disposal of any wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

All necessary coordination with CSX is part of Item 399 – CSX COORDINATION.

Payment for Special Mortar Repairs will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 366 REMOVE GRAFFITI

The work specified in Section T.366 for Remove Graffiti will be measured by the unit Square Foot, acceptably completed. The price per Square Foot shall include the square foot area of surfaces from which graffiti is removed, as indicated or directed. The work includes access, and all labor, material, and equipment to complete the work.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Removal of graffiti in areas where anti-graffiti coating is to be applied, if required, is incidental to Item 321 – APPLICATION OF ANTI-GRAFFITI COATING.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Remove Graffiti will be paid for at the contract unit price bid per square foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 367 FILL DRAINAGE PIPE WITH CONCRETE

The work specified in Section T.367 for Fill Drainage Pipe with Concrete will be measured by the unit Each (each drainage pipe filled with concrete), acceptably completed as specified. The price per Each shall include access, and all labor, material, and equipment necessary to complete the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

The filling of the existing, abandoned, drainage pipes with concrete at drainage system modification locations is part of Item 340 – MODIFY DRAINAGE SYSTEM.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Fill Drainage Pipe With Concrete will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 368 REPAIR BARRIER SLIDING PLATE CONNECTION SCREWS

The work specified in Section T.368 for Repair Barrier Sliding Plate Connection Screws will be measured by the unit Each (each location), acceptably completed, regardless of the number of connection screws and/or inserts requiring repair at that location. The price per Each (each location) includes all labor, material, and equipment necessary to complete the work.

Includes the following two (2) locations:

Ramp M – North Abutment East Barrier
Ramp M – North Abutment West Barrier

Replacement of inserts, if required, is considered incidental to this item of work.

This work does not include locations where barrier steel sliding plates are to be removed and replaced, or removed and reinstalled, as part of other expansion joint gland and expansion dam replacement work.

Removal and replacement of barrier steel hoods and associated connections at expansion joint gland and expansion joint dam replacement locations is included in Item 326 – REPLACE NEOPRENE STRIP SEAL GLAND, Item 327 – REPLACE NEOPRENE STRIP SEAL GLAND, RANDOLPH STREET OVERPASS, Item 328 – REPLACE NEOPRENE STRIP

SEAL EXPANSION DAM, and Item 329 – REPLACE TOOTH EXPANSION JOINT WITH MODULAR EXPANSION JOINT.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Payment for Repair Barrier Sliding Plate Connection Screws will be paid for at the contract unit price bid per each, acceptably completed as specified and as accepted by the Engineer.

ITEM 369 JOINT SEALING, SOUND BARRIERS

The work specified in Section T.369 for Joint Sealing, Sound Barriers will be measured by the unit Linear Foot, acceptably completed as specified. The price per Linear Foot shall include the linear footage of joints sealed, as directed. The work includes access, surface preparation, installation of new joint sealant and all labor, material and equipment required to complete the work, and the removal and disposal of any wastes generated by the work.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Joint Sealing, Sound Barriers will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 370 SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES (INCIDENTAL)

No measurement and payment shall be made for Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES. The cost of surface preparation and coating application of steel surfaces is incidental to cost of repairs as specified in other items of work.

For example, the surface preparation and coating application to bridge steel at strip seal expansion dam replacement locations is included in Item 328 – REPLACE NEOPRENE STRIP SEAL EXPANSION DAM.

ITEM 371 WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT (INCIDENTAL)

No measurement and payment shall be made for Item 371 – WORKER PROTECTION AND ENVIRONMENTAL MANAGMENT. Cost of worker protection and environmental managment is incidental to cost of repairs as specified in other items of work.

ITEM 372 WORK PLATFORMS AND PROTECTION SHIELDS

The work specified in Section T.372 for WORK PLATFORMS AND PROTECTION SHIELDS will be measured by the unit Lump Sum, acceptably completed as specified.

Payment for Work Platforms and Protection Shields will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 373 STEEL SIGN STRUCTURE – MONOPIPE, S-1 (DSS-0301)
ITEM 374 STEEL SIGN STRUCTURE – MONOPIPE, S-3 (DSS-0303)
ITEM 375 STEEL SIGN STRUCTURE – MONOPIPE, S-4 (DSS-0304)
ITEM 376 STEEL SIGN STRUCTURE – MONOPIPE, S-5 (DSS-0305)
ITEM 377 STEEL SIGN STRUCTURE – MONOPIPE, S-6 (DSS-0306)
ITEM 378 STEEL SIGN STRUCTURE – MONOPIPE, S-10 (DSS-0310)
ITEM 379 STEEL SIGN STRUCTURE – MONOPIPE, S-11 (DSS-0311)
ITEM 380 STEEL SIGN STRUCTURE – MONOPIPE, S-13 (DSS-0313)
ITEM 381 STEEL SIGN STRUCTURE – MONOPIPE, S-14 (DSS-0314)
ITEM 382 STEEL SIGN STRUCTURE – MONOPIPE, S-15 (DSS-0315)
ITEM 383 STEEL SIGN STRUCTURE – MONOPIPE, S-16 (DSS-0316)
ITEM 384 STEEL SIGN STRUCTURE – MONOPIPE, S-17EB (DSS-0317EB)
ITEM 385 STEEL SIGN STRUCTURE – MONOPIPE, S-17WB (DSS-0317WB)
ITEM 386 STEEL SIGN STRUCTURE – MONOPIPE, S-18 (DSS-0318)
ITEM 387 STEEL SIGN STRUCTURE – MONOPIPE, S-19 (DSS-0319)
ITEM 388 STEEL SIGN STRUCTURE – MONOPIPE, S-20 (DSS-0320)
ITEM 389 STEEL SIGN STRUCTURE – MONOPIPE, S-21 (DSS-0321)

The work specified in Section T.373 through 389 for Steel Sign Structure – Monopipe will be measured by the Lump Sum (for each sign structure), acceptably completed. The price per Lump Sum shall include access, and all labor, material, and equipment to complete the work. Painting is incidental to this item of work.

Removal of existing sign structures is measured and paid separately under Item 398 – REMOVAL OF EXISTING SIGN STRUCTURE.

Drilled caissons for sign structure foundations are measured and paid separately under Item 395 – DRILLED CAISSON CONSTRUCTION, 48” DIAMETER, Item 396 – DRILLED CAISSON CONSTRUCTION, 54” DIAMETER, and Item 397 – DRILLED CAISSON

CONSTRUCTION, 60” DIAMETER, and Item 400 – DRILLED CAISSON CONSTRUCTION, 72” DIAMETER.

Furnishing and installation of sign panels, Variable Message Signs (VMS), Lane Use Control Signals (LUCS), Variable Speed Limit Signs (VSLS), CCTV cameras, CCTV camera mounting brackets, luminaires, and power and communication cables and conduit are measured and paid separately.

ITS-related items are paid for under Item 244 – Variable Message Sign System, Walk-in, Item 245 – Variable Speed Limit Sign System, Front Access, Item 246 – Lane Use Control System, Front Access, and Item 247 – CCTV Camera System, Structure Mount.

Any excavation work performed outside of Sections T.395, T.396, T.397, and T.400 shall conform with and is part of Items T.24, T.26, and T.27.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Management of existing soil/embankment material associated with this task is included in Items T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

Payment for Steel Sign Structure - Monopipe will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 390 STEEL SIGN STRUCTURE – TRUSS, S-8 (DSS-0308)
ITEM 391 STEEL SIGN STRUCTURE – TRUSS, S-9 (DSS-0309)

The work specified in Section T.390 through T.391 for Steel Sign Structure – Truss will be measured by the Lump Sum (for each sign structure), acceptably completed. The price per Lump Sum shall include access, and all labor, material, and equipment to complete the work. Painting is incidental to this item of work.

This work includes the reconstruction of existing pedestal walls.

Removal of existing sign structures is measured and paid separately under Item 398 – REMOVAL OF EXISTING SIGN STRUCTURE.

Furnishing and installation of sign panels, CCTV cameras, CCTV camera mounting brackets, and power and communication cables and conduit are measured and paid for separately.

CCTV Camera-related items are paid for under Item 247 – CCTV Camera System, Structure Mount.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Removal and replacement of joint sealing material between new sign structure support wall and adjacent sound barrier wall panels is part of Item 369 – Joint Sealing, Sound Barriers.

Payment for Steel Sign Structure - Truss will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 392 STEEL SIGN STRUCTURE REPAIR, S-2 (DSS-0302)
ITEM 393 STEEL SIGN STRUCTURE REPAIR, S-23 (DSS-0323)
ITEM 394 STEEL SIGN STRUCTURE REPAIR, S-24 (DSS-0324)

The work specified in Section T.392 through T.394 for Steel Sign Structure Repair will be measured by the unit Lump Sum (for each sign structure), acceptably completed as specified. The price per Lump Sum includes access, and all labor, material, and equipment required to complete the work.

Painting is incidental. Preparation and coating of existing steel surfaces is to be performed in accordance with Item 370 – SURFACE PREPARATION AND COATING APPLICATION OF STEEL SURFACES.

Removal and return to the Authority of any requested lighting items and devices at Sign Structure S-2 is incidental to this item of work.

Removal of existing sign panels, furnishing and installation of new sign panels, removal of CCTV camera mounting bracket, removal and replacement of CCTV camera, and removal and replacement of lane use control signals (LUCS) are paid for separately.

Lane Use Control System-related items and CCTV Camera-related items are paid for under Item 246 – Lane Use Control System, Front Access, and Item 247 – CCTV Camera System, Structure Mount, respectively.

Overhead sign structure signage is part of Item 136 and shall conform with Section T.136.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Worker protection and environmental management is incidental to the cost of this item See T.371 - WORKER PROTECTION AND ENVIRONMENTAL MANAGEMENT.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Steel Sign Structure Repair will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 395 DRILLED CAISSON CONSTRUCTION, 48" DIAMETER
ITEM 396 DRILLED CAISSON CONSTRUCTION, 54" DIAMETER
ITEM 397 DRILLED CAISSON CONSTRUCTION, 60" DIAMETER
ITEM 400 DRILLED CAISSON CONSTRUCTION, 72" DIAMETER

The work specified in Section T.395 through T.397 and T.400 for Drilled Caisson Construction will be measured by the unit Linear Foot, acceptably completed.

Caisson per Linear Foot. Measured from the top of caisson to the bottom of caisson, including free-standing portions through air.

Permanent steel casing and reinforcing steel is incidental to this item.

Mobilization of drill rigs and all ancillary equipment, including frac tanks, is incidental to this item.

Disposal of soils, fluids, and slurry and associated analytical testing are not included in this cost item. Work required for characterization and disposal of soils, fluids and slurry is included in Items T.401. T.402, T.403, T.404, T.405, T.406, T.407, T.408, T.409 and T.410.

Payment for Drilled Caisson Construction will be paid for at the contract unit price bid per linear foot, acceptably completed as specified and as accepted by the Engineer.

ITEM 398 REMOVAL OF EXISTING SIGN STRUCTURE

The work specified in Section T.398 for Removal of Existing Sign Structure will be measured by the unit Lump Sum, acceptably completed, for removal of the following existing sign structures: S-1, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-18, S-19, S-20 and S-21. The price per Lump Sum shall include access, and all labor, material, and equipment to complete the work, remove and return to the Authority any requested ITS and lighting items or devices, and the removal and disposal of any wastes generated by the work.

Excavation, foreign borrow, furnishing and placing of topsoil, and seeding is incidental to this item of work.

Management of existing soil/embankment material associated with this task is included in Items T.401, T.402, T.403, T.405, T.406, T.407 and T.408.

Field measurements to verify existing dimensions are part of Item 3 – FIELD SURVEY AND ENGINEERING.

Maintenance and Protection of Traffic required for the work is part of Item 6 –MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION.

Work platforms and protection shields required for this work is part of Item 372 – WORK PLATFORMS AND PROTECTION SHIELDS.

Payment for Removal of Existing Sign Structure will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 399 CSX COORDINATION

The work specified in Section T.399 for CSX COORDINATION is based on a pre-determined amount (PDA), as specified in the contract, and will be measured based on acceptable completed work that was pre-approved. The work includes coordination with CSX to secure permission for work performed over and adjacent to the railroad facilities at the CSX Railroad Overpass. This shall include all fees associated with providing the necessary level of insurance, flag protection, electrical personnel, construction monitoring representatives, and construction reviews. In addition, the Contractor is responsible to enter into a design services and construction services agreement as required by CSX for successful completion of the work required in this Contract.

Payment for CSX COORDINATION is a pre-determined amount, and will be based on actual costs incurred by the Contractor on a force account or agreed to price for work acceptably completed. Any money remaining in this item at the end of the project will be credited to the Authority.

ITEM 401 HEALTH AND SAFETY PLAN

The work specified in T.401 for Health and Safety Plan will be measured by the unit Lump Sum, acceptably completed.

Separate payment will not be made for amendments to the HASP nor for the implementation of the HASP, including supply and operation of monitoring equipment and visual oversight/inspection performed during execution of the work that may include: abatement, select materials removal, excavation, handling, stockpiling and transport of regulated wastes. Lump sum is payable on Engineer acceptance of HASP.

Payment for Health and Safety Plan will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 402 WASTE MANAGEMENT PLAN

The work specified in T.402 for Waste Management Plan will be measured by the unit Lump Sum, acceptably completed.

Separate payment will not be made for the development, implementation, amendments, securing of permits, Final Report or other WMP tasks. Payment for implementation, monitoring and administration of the WMP, including supervision, documentation, and any monitoring or controls provided during execution of excavation, handling, stockpiling/containerizing, transportation and disposal of wastes, is included in the applicable disposal pay items. Payment of lump sum on Engineer approval of the WMP.

Payment for Waste Management Plan will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 403 EXCAVATION SAMPLING, ANALYSIS AND REPORTING

The work specified in T.403 for Excavation Sampling, Analysis and Reporting will be measured by the unit Lump Sum, acceptably completed. All equipment, materials and labor required to collect, locate, label and transport the samples, perform and quality assure all laboratory analyses, reduce and evaluate analytical data, prepare a summary report of sampling (Results Report) with attendant tables and figures and submit it to the Representative in draft and final form.

Payment at approval of the first Results Report.

Payment for Excavation Sampling, Analysis and Reporting will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 404 WATER/SLURRY SAMPLING, ANALYSIS AND REPORTING

The work specified in T.404 for Water/Slurry Sampling, Analysis and Reporting will be measured by the unit Lump Sum, acceptably completed. All equipment, materials, labor and expenses required to collect, locate, label and transport the samples, perform and quality assure all laboratory analyses, reduce and evaluate analytical data, prepare a summary report of sampling (Results Report) with attendant tables and figures and submit it to the Representative in draft and final form.

Payment at approval of the first Results Report.

Payment for Water/Slurry Sampling, Analysis and Reporting will be paid for at the contract lump sum price bid, acceptably completed as specified and as accepted by the Engineer.

ITEM 405 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF CLEAN FILL)
ITEM 406 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED FILL)
ITEM 407 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED RESIDUAL WASTE)
ITEM 408 OFF SITE DISPOSAL, SOLIDS, (DISPOSAL OF REGULATED HAZARDOUS WASTE)

Due to the contingent or unpredictable nature of the work being performed under Sections T.405 to T.408, the contract will include an item and a predetermined amount of money for the work specified under these sections. The contract item will have a unit of measure of PDA and a predetermined amount set as listed in the bid proposal. Payment for Work acceptably completed will be based on negotiated unit prices agreed upon with the Authority before performing the work, and any money remaining in these items at the end of the project will be credited to the Authority.

The work specified in Section T.405 to T.408 will be measured and paid by the ton. Cost for above items include all materials, labor, tools and equipment necessary therefore and incidental thereto.

The Authority will make payment for these items using certified weight tickets. Contractor should note that no additional payment shall be made for disposal of clean fill associated with planned Class 1, 1a, 1b, 2, 3 and 4 excavations as management of clean fill is incidental to the related excavation work. Payment for disposal of clean fill shall be limited to clean fill generated from drilled caissons.

Portions of the caisson slurry mixture may be stabilized by the disposal facility and disposed as a solid material. In such case payment will be made for the initial (pre-stabilized) weight received by the facility.

ITEM 409 OFF SITE DISPOSAL, LIQUIDS, (DISPOSAL OF NON-HAZARDOUS WATER)
ITEM 410 OFF SITE DISPOSAL, LIQUIDS, (DISPOSAL OF HAZARDOUS WATER)

Due to the contingent or unpredictable nature of the work being performed under Sections T.409 to T.410, the contract will include an item and a predetermined amount of money for the work specified under these sections. The contract item will have a unit of measure of PDA and a predetermined amount set as listed in the bid proposal.

Payment for Work acceptably completed will be based on negotiated unit prices agreed upon with the Authority before performing the work, and any money remaining in these items at the end of the project will be credited to the Authority.

The work specified in Sections T.409 and T.410 will be measured by the gallon. Cost for above items include all other materials, labor, tools and equipment necessary therefore and incidental thereto.

The Authority will make payment for these items using certified disposal receipts.

ITEM 411 NOT USED
ITEM 412 NOT USED
ITEM 413 NOT USED
ITEM 414 NOT USED

ITEM 415 TEMPORARY WORK PLATFORM AND PROTECTION SHIELDS – SIGNAL GANTRIES

The work specified in Section T.415 – TEMPORARY WORK PLATFORM AND PROTECTION SHIELDS – SIGNAL GANTRIES will be measured by the unit LUMP SUM, acceptably completed as specified.

This item will be paid at the contract LUMP SUM price bid, acceptably completed as specified and as accepted by the ENGINEER.

ITEM 416 RELOCATING AND RESETTING EXISTING STRUCTURE MOUNTED SIGNS – SIGNAL GANTRIES

The work specified in Section T.416 – RELOCATING AND RESETTING EXISTING STRUCTURE MOUNTED SIGNS – SIGNAL GANTRIES will be measured by the unit LUMP SUM, acceptably completed as specified.

This item will be paid at the contract LUMP SUM price bid, acceptably completed as specified and as accepted by the ENGINEER.

The mounting brackets are paid separately as part of Item 419 – SIGN AND SIGNAL MOUNTING BRACKETS – SIGNAL GANTRIES.

ITEM 417 DEMOLITION OF EXISTING SIGNAL GANTRIES – SIGNAL GANTRIES

The work specified in Section T.417 – DEMOLITION OF EXISTING SIGNAL GANTRIES – SIGNAL GANTRIES will be measured by a unit LUMP SUM, acceptably completed as specified. The lump sum price shall include the removal and disposal of existing signal gantries “A”, “B”, “C”, “D”, “I” and “J”.

Removal of the walkway railing, walkway grating and fascia member to the limits specified on the plans is included in this item.

Temporary support of the fascia member and walkway in spans adjacent to the limits of removal is incidental to this item.

Payment for DEMOLITION OF EXISTING SIGNAL GANTRIES – SIGNAL GANTRIES will be paid at the contract LUMP SUM price bid, acceptably completed as specified and as accepted by the ENGINEER.

The relocating and resetting of signs is paid for under Item 416.

Maintenance and Protection of Traffic during Construction is in accordance with Section T.423 and paid for as part of Item 423.

ITEM 418 SIGNAL GANTRIES – SIGNAL GANTRIES

The work specified in Section T.418 – SIGNAL GANTRIES shall consist of furnishing and placing structural steel as shown and detailed on the Contract Plans for new signal gantries. This includes but is not limited to the newly furnished hollow structural shapes, angles, plates and connections. Also included with this item are the newly furnished steel ladders and angles for railings. Additionally, this item includes the other newly furnished structural steel components including the transfer beam, modified walkway brackets and bracing used to support the new gantries. The work specified will be measured by the unit POUND acceptably completed as specified.

The reinstallation of the existing fascia member and walkway railing are incidental to this item and will not be measured.

Payment for SIGNAL GANTRIES will be paid for at the price bid per POUND, acceptably completed as specified and as accepted by the ENGINEER. Included in the cost of this item is the cost of surface preparation and coating system of the newly furnished steel and spot/zone painting to the coating system of the existing steel.

Not included in this item are signs, sign mounting brackets, lane signals, signal mounting brackets and maintenance and protection of traffic. These items are paid separately as part of other items of work.

ITEM 419 SIGN AND SIGNAL MOUNTING BRACKETS – SIGNAL GANTRIES

The work specified in Section T.419 – SIGN AND SIGNAL MOUNTING BRACKETS – SIGNAL GANTRIES will be measured by a unit LUMP SUM, acceptably completed as specified. The LUMP SUM price shall include furnishing and installing structural steel as shown and detailed on the Contract Plans for mounting signs and signals to new signal gantries.

Payment for SIGN AND SIGNAL MOUNTING BRACKETS – SIGNAL GANTRIES will be paid at the contract LUMP SUM price bid, acceptably completed as specified and as accepted by the ENGINEER. Included in this item is the surface preparation and coating of the furnished and existing steel.

Not included in this item are signs, lane signals and maintenance and protection of traffic. These items are paid separately as part of other items of work.

ITEM 420 NOT USED

ITEM 421 ALUMINUM WALKWAY GRATING – SIGNAL GANTRIES

The work specified in Section T.421 – ALUMINUM WALKWAY GRATING – SIGNAL GANTRIES will be measured by a unit LUMP SUM, acceptably completed as specified. This item includes the walkway grating to be installed on the new gantries, the new sections of grating to be installed on the existing bridge walkway and the modifications to the existing bridge walkway grating. The CONTRACTOR may elect to use new sections of grating instead of modifying existing grating at no additional expense to the DRPA.

Payment for ALUMINUM WALKWAY GRATING – SIGNAL GANTRIES will be paid for at the contract LUMP SUM price bid, acceptably completed as specified and as accepted by the ENGINEER.

ITEM 422 SURFACE PREPARATION AND COATING FOR STEEL – SIGNAL GANTRIES (INCIDENTAL)

No measurement and payment made for Item 422 – SURFACE PREPARATION AND COATING FOR STEEL – SIGNAL GANTRIES. Cost of preparing and coating new steel is incidental to cost of furnishing new steel members as specified in Items 418 and 419, as applicable. Cost of surface preparation and spot/zone painting on existing steel to be reinstalled or damaged during construction is also incidental to other Items 418 and 419 as applicable.

ITEM 423 MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION – SIGNAL GANTRIES

The work specified in Section T.423 – MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION – SIGNAL GANTRIES will be measured by the unit LUMP SUM, acceptably completed as specified. The LUMP SUM price shall include the furnishing, storing, installing, maintaining, moving and relocating all long-term and short-term traffic control devices unless otherwise indicated in the contract drawings; controlling, warning, guiding, and protecting vehicular and pedestrian traffic affected by construction of the Project;

restricting general public and construction vehicular traffic to approved routes; and prohibiting stopping and parking of vehicles adjacent to the work site. This item includes removal of temporary traffic control devices.

This item includes the submission of Maintenance and Protection of Traffic Plans for the approval of the DRPA and the applicable state or local agencies, including PennDOT, NJDOT, County of Camden, City of Gloucester and City of Philadelphia for all operations affecting traffic.

Maintenance and Protection of Traffic during construction will be paid for at the contract LUMP SUM price bid, acceptably completed as specified and as accepted by the Engineer. A monthly rate for determining the amount of partial payments will be calculated by dividing the lump sum price bid for this item by the number of months between the date of the Notice-to Proceed and the specified time (as specified in Special Provision SP.5) for total contract duration. No additional monthly payments will be made to the Contractor for construction duration that extends beyond the specified time for total contract duration. If all work is completed prior to the specified time for total contract duration, Contractor will be paid remaining balance of the amount bid for Item 423.

Separate payment will not be made for Traffic Control Coordinator, but all costs thereof shall be incidental to Maintenance and Protection of Traffic.

Any detours used exclusively for hauling materials and equipment for the convenience of the Contractor shall be constructed and maintained at no cost to the Authority.

The Engineering for preparing the Traffic Control Plans shall be incidental to this item.

All MPT costs shall be included as part of Item 423 unless the costs are otherwise specifically indicated as part of other Items.

ITEM 424 DEMOLITION OF CONDUITS FEEDING GANTRY FROM TOWERS –SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, which will include all the work specified in Section T.424 – DEMOLITION OF CONDUITS FEEDING GANTRY FROM TOWERS – SIGNAL GANTRIES. This work consists of removing the conduit and associated wiring from the power centers at the gantries back to the source panels at the tower. Additionally, the removal of associated junction boxes, conduit fasteners, and disposal of these items are also included.

The payment for DEMOLITION OF CONDUITS FEEDING GANTRY FROM TOWERS – SIGNAL GANTRIES will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer

ITEM 425 DEMOLITION OF CONDUITS ON GANTRIES – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, which will include all the work specified in Section T.425 – DEMOLITION OF CONDUITS ON GANTRIES – SIGNAL GANTRIES. This work consists of removing the conduits and associated wiring from the existing sign lightings, lane uses signals, and speed limit signs back to the source panels at the gantries. Additionally, the removal of associated junction boxes, conduit fasteners, and disposal of these items are also included in this item.

The payment for the DEMOLITION OF CONDUITS ON GANTRIES – SIGNAL GANTRIES will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 426 DEMOLITION OF LOAD CENTER AND TRANSFORMERS – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, which will include all the work specified in Section T.426 – DEMOLITION LOAD CENTER AND TRANSFORMERS – SIGNAL GANTIES. This work includes removing and transporting off the bridge the existing load centers and transformers at the gantries as shown on the contract drawings and as directed by the Engineer.

The payment for DEMOLITION LOAD CENTER AND TRANSFORMERS – SIGNAL GANTRIES will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 427 ELECTRICAL SUPPORTS AND SEISMIC RESTRAINTS – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, which will include all the work specified in Section T.427 – ELECTRICAL SUPPORTS AND SEISMIC RESTRAINST – SIGNAL GANTRIES. This work includes the installation of new messengers and supports, as shown on the contract drawings and as directed by the Engineer.

The payment for ELECTRICAL SUPPORTS AND SEISMIC RESTRAINTS – SIGNAL GANTRIES will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 428 IDENTIFICATION FOR ELECTRICAL SYSTEMS – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, which will include all the work specified in Section T.428 – IDENTIFICATION FOR ELECTRICAL SYSTEMS – SIGNAL GANTRIES. This work includes the identification of power and control cables, identification of conductors, equipment identification labels and miscellaneous identification products.

The payment for the IDENTIFICATION FOR ELECTRICAL SYSTEMS – SIGNAL GANTRIES will be paid at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 429 NOT USED

ITEM 430 AWG #6 CONDUCTORS – SIGNAL GANTRIES

This work will be measured per LINEAR FOOT, acceptably completed as specified in Section T.430 - #6 CONDUCTORS – SIGNAL GANTRIES. Measurement is per the actual in-place length of cable including longitudinal, lateral, and vertical runs. This work includes the installation of new #6 conductors from power panels at the towers back to the source panels at the anchorages. Additionally, the installation of new #6 conductors from the lighting panels to power panels at the towers, as shown on the contract drawings and as directed by the Engineer.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer.

ITEM 431 AWG #8 CONDUCTORS – SIGNAL GANTRIES

This work will be measured per LINEAR FOOT, acceptably completed as specified in Section T.431 - #8 CONDUCTORS – SIGNAL GANTRIES. Measurement is per the actual in-place length of cable including longitudinal, lateral, and vertical runs. This work includes the installation of new #8 conductors from power panels at the towers back to the source panels at the anchorages. Additionally, the installation of new #8 conductors from the lighting panels to power panels at the towers, as shown on the contract drawings and as directed by the Engineer.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer.

ITEM 432 AWG #10 CONDUCTORS – SIGNAL GANTRIES

This work will be measured per LINEAR FOOT, acceptably completed as specified in Section T.432 - #10 CONDUCTORS – SIGNAL GANTRIES. Measurement is per the actual in-place length of cable including longitudinal, lateral, and vertical runs. This work includes the installation of new #10 conductors from power panels at the towers back to the source panels at the anchorages. Additionally, the installation of new #10 conductors from the lighting panels to power panels at the towers, as shown on the contract drawings and as directed by the Engineer.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer.

ITEM 433 MISCELLANEOUS CONDUCTORS – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, acceptably completed as specified in Section T.433 – MISCELLANEOUS CONDUCTOR – SIGNAL GANTRIES. This work includes the installation of new conductors from the SCADA cabinets and power centers to the gantries as shown on the contract drawings and as directed by the Engineer. This work also includes conductors as shown on details and wiring diagrams for gantry systems and devices

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 434 MISCELLANEOUS CONDUITS – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis, acceptably completed as specified in Section T.434 – MISCELLANEOUS CONDUITS – SIGNAL GANTRIES. This work includes the installation of new FLNC conduits for any transition between any pull box in the barrier to solid conduit; as shown on the contract drawings and the installation of new FLNC conduits for any transition between both ends of solid conduits at the bridge's expansion joints, which are not shown on the contract drawings, but as directed by the Engineer. This work also includes conduits as shown on details and wiring diagrams for gantry systems and devices including but not limited to Lane Use Signs and Speed Limit Signs.

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 435 1-INCH RGS CONDUIT – SIGNAL GANTRIES

This work will be measured per LINEAR FOOT, acceptably completed as specified in Section T.435 - 1-INCH RGS CONDUITS – SIGNAL GANTRIES. Measurement is per the actual in-place length of cable including longitudinal, lateral and vertical runs. This work includes the installation of new 1-inch RGS conduits from the existing power panels to the new power centers.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer.

ITEM 436 2-INCH RGS CONDUIT – SIGNAL GANTRIES

This work will be measured per LINEAR FOOT, acceptably completed as specified in Section T.436 – 2-INCH RGS CONDUITS – SIGNAL GANTRIES. Measurement is per the actual in-place length of cable including longitudinal, lateral and vertical runs. This work includes the

installation of new 2 inch RGS conduits from the existing power panels to the new power centers.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer.

ITEM 437 4-INCH RGS CONDUIT – SIGNAL GANTRIES

This work will be measured per LINEAR FOOT, acceptably completed as specified in Section T.437- 4- INCH RGS CONDUITS – SIGNAL GANTRIES. Measurement is per the actual in-place length of cable including longitudinal, lateral and vertical runs. This work includes the installation of new 4- inch RGS conduits from the anchorages to the gantries.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer.

ITEM 438 NOT USED

ITEM 439 DEMOLITION LIGHTING CONTROL AND ASSOCIATED WIRING – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis which will include all the work as specified in Section T.439 – DEMOLITION LIGHTING CONTROL AND ASSOCIATED WIRING – SIGNAL GANTRIES. This work consists of removing the lighting contactors in the existing light panels at the gantries and in the anchorages. Additionally, the removal of associated control wiring from the lighting contactors to the control cabinets, as shown on the contract drawings, and disposal of these items are also included.

The payment for DEMOLITION LIGHTING CONTROL AND ASSOCIATED WIRING – SIGNAL GANTRIES will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 440 DEMOLITION GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis which will include all the work specified in Section T.440 – DEMOLITION GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES. This work consists of removing the signage lighting on the gantries and associated wiring back to sign lighting panels on the gantries.

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 441 DEMOLITION GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis which will include all the work specified in Section T.441 – DEMOLITION GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES. This work consists of removing the gantry lane signal lighting on the gantries and associate wiring back to the controller cabinet on the gantries.

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 442 GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES

This work will be bid by the unit EACH which will include all the work as specified in Section T.442 – GANTRY SIGNAGE LIGHTING – SIGNAL GANTRIES. This work consists of installation of new signage lighting.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer.

ITEM 443 GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES

This work will be bid by the unit EACH which will include all the work as specified in Section T.443 – GANTRY LANE SIGNAL LIGHTING – SIGNAL GANTRIES. This work consists of installation of new lane signal luminaires at new locations.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer.

ITEM 444 SPECIAL SYSTEMS DEMOLITION – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis which will include all the work specified in Section T.444 – SPECIAL SYSTEMS DEMOLITION – SIGNAL GANTRIES. This work consists of removing any miscellaneous fiber cabling or fiber jumper cables from the fiber splice point to the removed gantry.

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 445 CAMERA REMOVAL-RESETTING – SIGNAL GANTRIES

This work will be bid on by the unit EACH will include all the work as specified in Section T.445 – CAMERA REMOVAL-RESETTING – SIGNAL GANTRIES. This work consists of removing and resetting of existing CCTV cameras and includes new or modified structural steel mounting brackets as required.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer.

ITEM 446 24 STRAND SM OUTSIDE PLANT FOC – SIGNAL GANTRIES

The work specified in Section T.446 – 12 STRAND SM OUTSIDE PLANT FOC – SIGNAL GANTRIES will be measured by the LINEAR FOOT of cable furnished and installed as specified and as accepted by the Engineer.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer. The price per linear foot shall include the furnishing of all tools, labor, equipment and materials necessary to complete the entire work in accordance with the Contract Drawings, Contract Specifications, and as directed by the Engineer.

ITEM 447 TESTING FOR FIBER – SIGNAL GANTRIES

The work specified in Section T.447 – TESTING FOR FIBER – SIGNAL GANTRIES will be measured by a unit LUMP SUM, acceptably completed as specified. The LUMP SUM price shall include the furnishing of all tools, labor, equipment and materials necessary to complete the entire work in accordance with the Contract Drawings, Contract Specifications, and as directed by the Engineer.

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 448 FIBER OPTIC SPLICE CASE – SIGNAL GANTRIES

The work specified in Section T.448 – FIBER OPTIC SPLICE CASE – SIGNAL GANTRIES will be on a LUMP SUM basis, acceptably completed.

Payment will be paid for at the contract LUMP SUM price, acceptably completed as specified and as accepted by the Engineer. The price shall include the furnishing of all tools, labor, equipment and materials necessary to complete the entire work in accordance with the Contract Drawings, Contract Specifications, and as directed by the Engineer.

ITEM 449 FUSION SPLICING – SIGNAL GANTRIES

The work specified in Section T.449 – FUSION SPLICING – SIGNAL GANTRIES will be measured by a unit LUMP SUM, acceptable completed as specified. The LUMP SUM price shall include the furnishing of all tools, labor, equipment and materials necessary to complete the entire work in accordance with the Contract Drawings, Contract Specifications, and as directed by the Engineer.

Payment will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 450 INNERDUCT- SIGNAL GANTRIES

The work specified in Section T.450 – INNERSDUCT – SIGNAL GANTRIES will be measured by the LINEAR FOOT of innerduct furnished and installed as specified and as accepted by the Engineer.

Payment will be paid for at the contract unit price per LINEAR FOOT, acceptably completed as specified and as accepted by the Engineer. The price per LINEAR FOOT shall include the furnishing of all tools, labor, equipment and materials necessary to complete the entire work in accordance with the Contract Drawings, Contract Specifications, and as directed by the Engineer.

ITEM 451 PANELBOARDS – SIGNAL GANTRIES

The work specified in Section T.451 – PANELBOARDS – SIGNAL GANTRIES will be measured per EACH unit, acceptably installed as specified and as accepted by the Engineer.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer. The price per unit EACH shall include furnishing, installing, and substantiating the new electrical panels at the gantries are functioning in accordance with the Contract Drawings and as directed by the Engineer.

ITEM 452 DRY-TYPE TRANSFORMERS (600V AND LESS) – SIGNAL GANTRIES

The work specified in Section T.452 – DRY-TYPE TRANSFORMERS (600V AND LESS) – SIGNAL GANTRIES will be measured per EACH unit, acceptably installed as specified and as accepted by the Engineer.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer. The price per unit EACH shall include furnishing, installing, operating the new transformers at the gantries in accordance with the Contract Drawings and as directed by the Engineer.

ITEM 453 GROUNDING AND BONDING – SIGNAL GANTRIES

This work will be bid on a LUMP SUM basis which will include all the work specified in Section T.453 – GROUNDING AND BONDING – SIGNAL GANTRIES. This work consists of the installation of new grounding and bonding for electrical equipment at the gantries. Additionally, the installation of grounding and bonding for light pole on the bridge are also included.

The payment for GROUNDING AND BONDING – SIGNAL GANTRIES will be paid for at the contract LUMP SUM bid price, acceptably completed as specified and as accepted by the Engineer.

ITEM 454 BASIC ELECTRICAL MATERIALS AND METHODS – SIGNAL GANTRIES (INCIDENTAL)

No quantities or payment are associated with this item. All costs associated with Section T.454 – BASIC ELECTRICAL MATERIALS AND METHODS – SIGNAL GANTRIES should be considered incidental to other items.

ITEM 455 VARIABLE SPEED LIMIT (VSL) SIGN – SIGNAL GANTRIES

This work will be bid by the unit EACH which will include all the work as specified in Section T.455 – VARIABLE SPEED LIMIT (VSL) SIGN – SIGNAL GANTRIES. This work consists of installation of new VSL Signs at new locations.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer.

ITEM 456 NETWORK SWITCH – SIGNAL GANTRIES

This work will be bid by the unit EACH which will include all the work as specified in Section T.456 – NETWORK SWITCH – SIGNAL GANTRIES. This work consists of installation of new fiber network switches in the anchorages including cabinets and power to network switches.

Payment will be paid for at the contract unit price per EACH, acceptably completed as specified and as accepted by the Engineer.

ITEM 457 SITE COORDINATION AND CONDITIONS

This is a predetermined allowance item which covers contingent Work required for contract completion to address "Differing Site Conditions". Measurement of the Work is based on acceptable completed Work that was pre-approved.

Payment for Site Coordination and Conditions will be for only unforeseen conditions and any money remaining in this item at the end of the project will be credited to the Authority. Payment will be based on actual costs incurred by the Contractor on a force account or agreed to price for Work acceptably completed.

ITEM 458 INCENTIVE FOR EARLY COMPLETION, STAGES 1 THROUGH 2

Early completion for construction Stages 1 through 2 is determined per Section T.458.1.1

The Authority will compensate the Contractor $25,000 per calendar day as an incentive for early completion of Stages 1 through 2 work. The total dollar incentive amount for early completion is capped at $4,000,000. Compensation will be paid from the pre-determined amount shown on the bid form. Any money remaining in this item as the end of the project will be credited to the Authority.

ITEM 459 NOT USED
ITEM 460 NOT USED
ITEM 461 NOT USED
ITEM 462 NOT USED
ITEM 463 NOT USED
ITEM 464 NOT USED
ITEM 465 NOT USED
ITEM 466 NOT USED
ITEM 467 NOT USED
ITEM 468 NOT USED
ITEM 469 NOT USED
ITEM 470 NOT USED
ITEM 471 NOT USED
ITEM 472 NOT USED
ITEM 473 NOT USED
ITEM 474 NOT USED
ITEM 475 NOT USED
ITEM 476 NOT USED
ITEM 477 NOT USED
ITEM 478 NOT USED
ITEM 479 NOT USED
ITEM 480 NOT USED